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COMMAND AND GENERAL STAFF SCHOOL

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XUM

VOLUME XXIV JANUARY 1945 NUMBER 10

COMMAND AND GENERAL STAFF SCHOOL

MILITARY REVIEW

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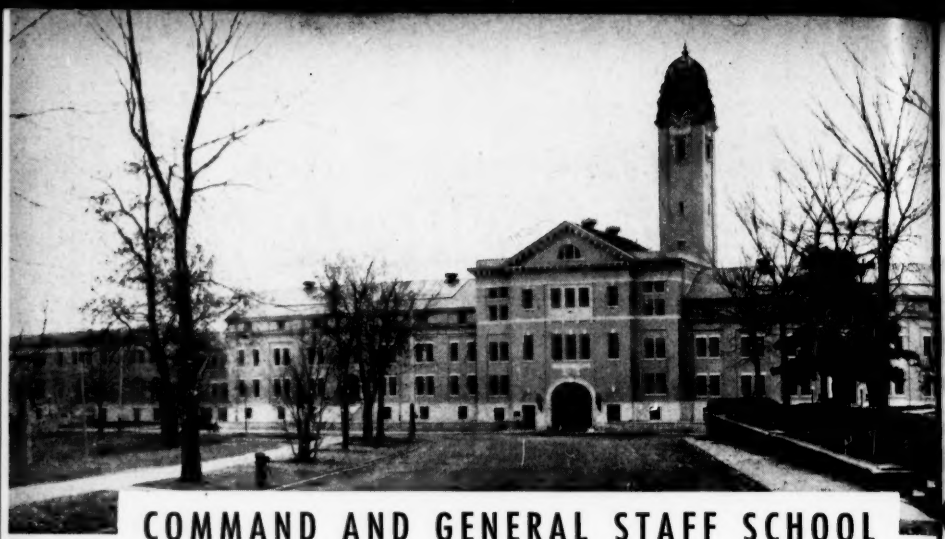

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German Tank Tactics in France

The following two accounts, "German Armored Tactics" and "Fighting the German Tank and Infantry Team," describe combat experiences of the XIX Corps in Normandy and farther south. They were originally issued on 14 July and 30 July 1944, and distributed to all divisions and corps troops of the XIX Corps so that at least one copy got to each company. They were sent to the MILITARY REVIEW *by Major General Charles H. Corlett, Commanding General, XIX Corps.*

—THE EDITOR.

GERMAN ARMORED TACTICS

GENERAL.—Our troops have been in contact with German armor and armored units. A recent major attack by German armor came from the Panzer Lehr Division. On 11 July 1944, it attacked with two armored infantry regiments abreast and tank battalions behind. The armored infantry was accompanied by tanks. When its left regiment made a penetration, the Mark V [Panther tank] battalion of the division was brought up to be committed to action. Here it was worked over by both air and artillery. As a result of this attack, the enemy gained no ground. He lost approximately eighteen tanks from ground action and a reported twenty-two from air. Approximately 200 prisoners were taken.

Lessons.—Experiences on both this and the British front have shown that German tank tactics have had several definite characteristics. These include:

a. Tanks have not been employed in mass. The general use plays four or five tanks with a company of infantry.

b. Tanks have stayed on the roads. They used the main road net as far forward as possible, then went to the secondary roads, and only rarely broke into the fields.

c. German tanks are often dug in, well camouflaged, have alternate dug-in firing positions, and at times use buildings for shelter, protection, and concealment.

d. The Germans will take us under fire at extreme ranges. Their Tiger with its 88-mm gun or the Panther with its 75-mm can penetrate the Sherman tank at 2,500 yards. In this type of terrain, however, and in the action with the Panzer Lehr Division, the tanks were engaged by us at a maximum range of 400 yards with a minimum of 150.

e. Self-propelled guns from roving positions have been used extensively by the Germans. These are often mistaken for tanks.

f. German tanks have always operated with infantry.

Antitank.—Our M-10 tank destroyer, with its 3-inch gun using armor-piercing cap ammunition at a range of 150 to 200 yards, shot it out with a Panther and destroyed the Panther. Of four frontal hull hits, the three that impacted on the upper front hull face bounced off. The one that landed on the lower front hull face penetrated. Two frontal hits were made on the turret. The one above the gun penetrated. The other below the gun ricocheted from the turret into the top plate of the tank hull and then penetrated. Our infantry with the bazooka have immobilized and then destroyed Mark IV tanks. The infantry and tank destroyers are not only competent but confident of containing German tanks within our lines and destroying them. After German tanks made their penetration, they have wandered aimlessly around and been destroyed without too much difficulty. Our infantry accompanying our tank destroyers or tanks should concentrate on the German infantry accompanying the German armor. The Panzer Grenadier Regiments were well equipped with bazookas.

Notes.—a. Most German tanks encountered are covered with a plastic, somewhat like rough linoleum, to prevent the adhesion of magnetic mines. This has been colored with camouflage paint.

b. The Mark IV tank captured intact ran very smoothly and without much noise.

c. One German tank was covered with chicken wire and well bedecked with shrubbery and branches. When it was motionless

inside a prepared cut-out of a hedgerow, it filled out the normal outline of the hedgerow and was virtually invisible. Only when it moved was it noticed. The Germans go to great lengths to achieve excellent camouflage.

d. On the British sector, the Germans have permitted accompanying infantrymen from our attacking forces to pass over concealed antitank guns. These antitank guns open up when a suitable target is found.

e. Mark IV tanks have had a skirting of offset plates around them to cause detonation of our entering projectile before it reached the real armor.

Conclusions.—After the field day on the tanks of the Panzer Lehr Division, there should be no doubt in anyone's mind but that our weapons and antitank tactics are sound and have brought excellent results. All units should be encouraged to go out offensively and get the tanks that come within range of their weapons.

The Panzer Lehr Division was composed of instructors and demonstration troops in the use of armor. They have already received one lesson they did not expect to get. Let's give them and their students another one!

Fighting the German Tank and Infantry Team

An officer of this staff on 28-29 July had an excellent opportunity to observe German armor and infantry attacking us. The notes that follow are based on his close observations over a thirty-six hour period.

The German units were those with which this corps is now in contact [30 July], namely tanks from the 2d Panzer Division and infantry from the 266th Infantry Division. The tactics described were employed by the Germans in the present moving situation and will probably be repeated.

The Germans advanced westward in three parallel columns, each consisting of tanks accompanied by infantry. The center column moved down the main road, shooting rapidly and moving at a fast rate. It went from hill to hill with the accompanying infantry spread only one field out on both sides dogtrotting through the fields and over the hedgerows. The center column totaled only approximately eight track-laying vehicles. At least three of these were tanks, one or two were probably self-propelled guns and the others probably half-track troop carriers. Total forces sent from Tessy to capture and hold the main cross road at La Denisiere consisted of two companies of infantry and probably not more than ten tanks. The number observed by this officer included only the track-laying vehicles named above and possibly a platoon of infantry.

The leading tank fired the "75" rapidly, getting both graze and air bursts, while its machine guns, supplemented by those of following vehicles, sprayed the tops of every hedgerow. The noise, and visible and audible effect upon the shrubbery and tops of the hedgerows and trees, was extremely effective. Before the shock of the guns discharged at close range and the garden-hose spray of machine-gun bullets had even taken full effect, German infantrymen were over the hedgerow and into the field, dogtrotting through to the next with great determination and courage. They knew where they were going and went there fast. Because their number was so small and they were interested only in attaining the group's objective, their mopping up process was negligible. Thus, of the troops overrun in this fashion, a good ninety-five percent were neither killed, wounded, captured, nor missing for more than two or three days. The ease and rapidity with which this small attacking force made its penetration, achieved its objective, sat on the objective, and denied the east-west road and interfered with traffic on the north-south road, plus the probable similar employment of smaller groups on identic missions in the immediate future, makes this analysis of what they did and how they did it of more than ordinary interest; it likewise points to certain remedial equipment, training practices, and techniques that can easily stop such penetrations in the future.

Throughout the night, the Germans reacted forcefully by fire and limited movement to any approach. Their tanks moved slowly and

compared to the Sherman tank, silently. Immediately after firing, each moved to a new position twenty-five to fifty yards away from the point used in firing. The noise discipline of the tank crews and accompanying infantry was superior. No talking, shouting, or any sound except machine-gun or cannon fire, starting of motors, and quiet deliberate moving from one position to another were the only sounds that carried over 100 yards. On the other hand, the approach of an American tank and the passage of most American motor convoys was rapidly identifiable by the loud shouting, talking, and orders-giving of the American troops who approached or passed by the position. American tanks were quickly identified by their loud unmuffled motor noise and the propensity of American tank drivers to "gun" their motors; the Germans, on the other hand, always eased the tank forward, traveled at low speed, and were remarkably quiet in all operations except firing. They used long bursts of their rapid-firing machine guns to discourage guests. If pressed at all, they shot flares which brought down their own artillery and mortars on their flanks. Their handling of their tanks was bold and sure. They acted as if they knew exactly where they wanted to go, how, and then went there with vigor and determination. At 0230, in the darkest part of the night, one tank moved out and headed towards the northmost column, making as little noise as possible. Somewhat later, it appeared that a lone American tank on reconnaissance pushed up against the nose of the ridge that the German tanks had organized, and the reception given it was a lavish pyrotechnic display.

A similar disruption by a comparable German effort can be prevented in the future by augmenting present antitank practices by some of the following:

a. Equip numerous vehicles with a smoke grenade that could be lashed to some well known, widely disseminated, and readily accessible spot on the vehicle—possibly the steering column. Upon the approach of an enemy tank, use of the grenade in the normal canalized route of tank approach will probably slow up the tank until the smoke clears. The German tank and infantry fear our use of gas and no tank normally will advance into the unknown hazards of a smoke screen.

b. The liberal spraying of the hedgerow with machine-gun fire completely discourages riflemen or bazooka firers from even aiming over or around a hedgerow. For this reason, slots should be dug through the hedgerow at such angles and at odd levels so that fire from the tank's position on the road cannot go through the slot, but so sighted as to permit a rifle grenade or a bazooka to be aimed and fired when the tank reaches some already selected point. The firer must have cover from the tank spray while he is aiming and firing. When the first tank is immobilized, and it is hoped burning, the fight becomes a standard infantry fight with standard techniques working as effectively as ever.

Our object must be to indoctrinate, train, and equip any group of from five soldiers up so that the approach of a tank is as well prepared for as is the approach of an enemy plane or enemy infantrymen. Once the local team has planned its use of the weapons and tools it has available, the words "German tanks are coming" will cause no alarm, and in lieu thereof will speedily bring about the destruction of at least the leading vehicle, the failure of the German armor to accomplish its mission, and the normal quick surrender, as has been so frequent in the past few days, of a good percentage of enemy troops engaged the minute they realize that we are prepared to meet them and have stopped their advance.

The comradeship between the Services, the dogged endurance and the fighting courage shown during our period of adversity, are needed just as much now that we are striving to defeat utterly the power of Germany.

—Admiral Sir Andrew Cunningham

Advance Base -- Southwest Pacific Area

COLONEL HARRY DISSTON, *Cavalry*

THE success of the war in the Southwest Pacific Area (SWPA) is perhaps more closely than elsewhere associated with bases and ships.

The pattern is familiar: terrific air bombardment of the objective and, to confuse the Jap, other probable objectives in the vicinity; a surprise amphibious landing supported by naval gunfire and by air bombardment and strafing; seizure of the airstrip(s); rapid repair and extension of the strip and port facilities; mopping up; establishment of an operational air base; preparation for another bypass landing. The establishment and operation of forward bases necessarily become a matter of considerable importance both to the present and to future operations.

The mission, the functions, and some of the more important and interesting activities of a typical forward island troop base (staging area) in the SWPA are outlined in this article. Frequently, such an installation is combined with a supply base or point. A staging area only will be considered here.

MISSION

To provide a headquarters, necessary troops, equipment, areas, installations, and activities to receive, stage, supply, assist in the training of, and evacuate combat troops.

GEOGRAPHICAL CHARACTERISTICS

The territorial location selected should, to the extent possible, have the following geographical characteristics, largely in the order mentioned:

1. A location as close as practicable to areas of projected operations consistent with reasonable security from enemy action.

2. Inclusion of an area suitable for the construction of bomber and fighter airstrips, dispersal areas, and aircraft maintenance installations.

3. A good harbor and beach, permitting the construction of at least three Liberty ship docks, two jetties suitable for lighterage operations, and eight LST (landing ship, tank) jetties.

4. Sufficient coastal plain of easily-drained, flat, gently-sloping or low-hill land, to provide, in addition to the aircraft installations, bivouac areas for the service and staged troops, supply depots, a suitable road net, training areas, and limited defensive installations. This requires a usable area of approximately thirty-six square miles.

5. A good climate, relative freedom from disease and disease-bearing insects, relatively little rainfall, and soil which permits ease in construction of roads, dumps, and airstrips, and is reasonably absorbent. These features can be considered, however, only where a *choice* of areas is practicable in view of operational requirements (location) and items 2, 3, and 4 preceding.

SPECIFIC FUNCTIONS, ACTIVITIES, AND RESPONSIBILITIES

The broad and inclusive mission of a forward base requires, of course, considerable amplification in order to visualize how it is accomplished. There follows a list of the specific functions, activities, and responsibilities of a forward base commander, which will exploit to the fullest extent the scope of his mission without exceeding its limitations.

1. Receive, unload, and turn around, with the greatest possible speed, ships calling at the base. This is the responsibility of the Port Operations Officer, utilizing the port and harbor craft companies, motor transport, and the labor of staged troops and natives.

2. Orient incoming unit commanders and casuals at once on requirements for malaria and typhus control and such other activities as are deemed necessary by the commanding officer. A mimeographed sheet of specific instructions emphasizing disease preventive measures and a compilation of base regulations supplement verbal instructions of the boarding party meeting the ship in the stream or the plane at the airstrip.

3. Receive and store all classes of supply assigned to depots and units on the island. The responsibility for this rests with the Base Supply Section heads (Quartermaster, Ordnance, Chemical Warfare Service, etc.) under the Base Service Commander. Depot, service, and truck companies and staged troop labor accomplish the job.

4. Maintain levels of supply prescribed by higher headquarters. This involves requisitions on a designated intersupply base. If not available there, the latter extracts the requisition to a mainland supply agency.

5. Provide adequate bivouac and training areas for staging troops. Typically, areas are provided for two or three divisions and the separate groups, battalions, companies, and detachments required for task forces. The Base Area Commander handles the details. Areas suitable for various types and strength units are continually reconnoitered and selected, anticipating a variety of occupation; they are assigned and further developed when troop movement directives are received.

6. Provide adequate hospitals, medical service, sanitary measures and inspections, and malaria and typhus control.

These activities are planned, directed, and coordinated by the Base Surgeon.

7. Plan, construct, and maintain roads and buildings and initiate such other engineering projects as required, including relocations where necessary.

This, of course, is the Base Engineer's job. Engineer units are organic in the station complement; staging engineer units are utilized to the extent necessary and practicable.

8. Coordinate, direct, and control means and personnel for defense of the island air, antiaircraft artillery, ground, and naval forces. Included are procedures in the event of air, naval, landing, and chemical attack. The defense plan includes aircraft; antiaircraft guns, automatic weapons, and searchlights; signal air warning; a mobile defense battalion, outposts, and patrols, with, of course, a plan for using staged troops in the event of an attack in force. The plan is prepared and the installations supervised by Base Headquarters; much of the necessary personnel and installations are provided by the senior combat commander from staged units.

9. Establish and assure the operation of an adequate procedure for fire prevention and effective action in the event of fire.

10. Receive, billet, mess, utilize, and return to their organizations promptly all casuals. Normally, a replacement company or battalion is stationed at the base; if not, staged troops provide the personnel, and Base Headquarters the direction and supervision under the Base Area Commander.

11. Prepare, maintain, and distribute to appropriate headquarters, a station list for the island, and a location map.

12. Coordinate range firing of all organizations.

13. Provide adequate communication, wire and radio, within the island and to appropriate headquarters off the island. Adequate signal personnel are included in the station complement, under the direction of the Base Signal Officer.

14. Maintain liaison with all organizations on the island not under control of Base Headquarters.

15. Provide training facilities and training aids for all organizations on the island. Coordinate location and use of training facilities and aids. Provide a training program for units under control of Base Headquarters. These activities are, of course, the responsibility of the Base S-3. The first is limited generally to combat firing ranges, to include impact areas and firing positions for artillery, landing craft and beach areas, obstacle courses, and swimming facilities.

16. Guard property and prevent vandalism.

17. Control traffic and place appropriate signs.

18. Establish and enforce security regulations.

These activities are under the direction and supervision of the Base Provost Marshal through the military police company or battalion included in the station complement; staged unit military police detachments and

companies assist, largely in their own and adjacent areas.

19. Supervise and direct unexploded bomb disposal, under direction of the Base Ordnance Officer.

20. Provide, coordinate, and supervise entertainment and the means of providing it. This includes movies, traveling troupes, fights, and interunit ball games; distribution of magazines, books, and games; clearing and guarding beaches; and operation of service clubs and canteens. This work is accomplished through the Base Special Services Officer and the special service company and through the American Red Cross.

21. Provide for adequate exchange supplies, facilities, and service.

22. Reception, care, and disposition of salvage.

23. Administration of the command including personnel, finance, morale, and military justice.

24. Handling mail and censorship.

25. Assist in amphibious movements.

26. Command of all USASOS [United States Army Services of Supply] troops within the territorial boundaries of the base.

Where a task force headquarters is at the base, or a unit larger than a regiment is involved, only such assistance as directed or requested is provided. It is strictly the tactical unit's show. Where, however, the unit involved is the size of a regiment or less, or the movement involves several small, unrelated organizations, the Base Commander directs and supervises all activities concerned with the movement. Standard presentation of logistical data and standing operating procedures are prepared.

Organization

The organization consists of a headquarters and service units. The headquarters is functional. Its principal subdivisions are four commands: Base Port Command, Base Service Center, Base Area Command, and Base Motor Command. There is also an "S" Staff, Administrative Service (Adjutant General, Inspector General, Finance, Provost Marshal, etc.), and a Control Branch. The commands control, supervise, and are responsible for the activities of the service troops.

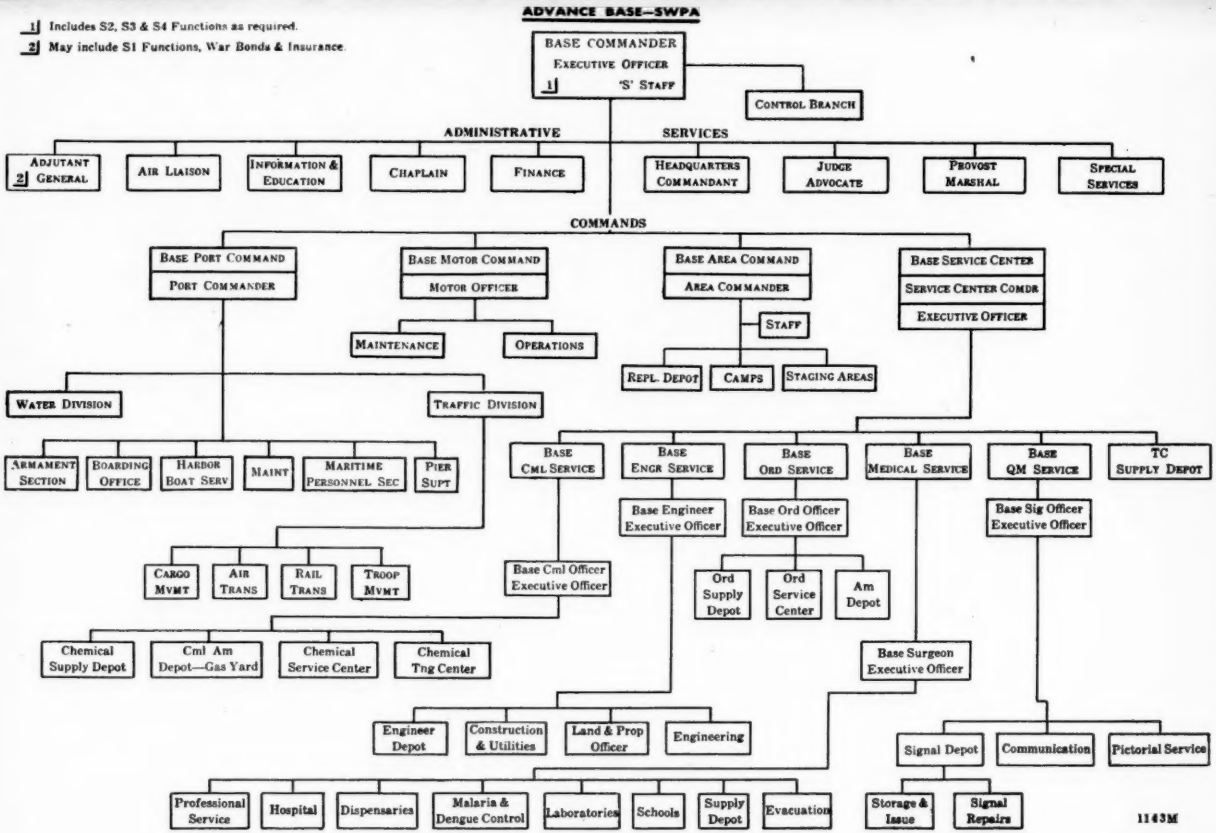
Headquarters of a base this size (staging 50,000 to 100,000 troops) would comprise approximately 180 officers and 500 men. The service troops would number approximately 20,000. They consist of port and harbor craft companies; engineer battalions, depot companies, and maintenance companies; ordnance companies—medium maintenance, ammunition, and depot; quartermaster companies—depot, gas, truck, bakery, laundry, graves registration; a station or general hospital, or both; medical supply depot; signal units—radio, wire operation and maintenance, line construction, and depot; a Chemical Warfare Service composite company; a military police company or battalion; a replacement company or battalion for handling casuals; air force signal air-warning platoons; and antiaircraft artillery batteries. An organization chart is shown on page 9.

The Port Command includes a water and a traffic division; the Service Center includes the classical six supply services and the Transportation Corps supply depot; the Base Area Command is concerned largely with the administration and operation of camps (including rest and leave areas) and staging areas, and the maintenance of liaison with units of the ground and air forces occupying the staging areas and camps and the performance of certain specific services for them; the functions of the Base Motor Command are obvious.

The use of staged troops to augment the base service troops as necessary is SOP.

Depots

The dumps established are: Class I (rations), Class II and IV (clothing and equipment), Class III (petrol, oil, and lubricants), Class V (ammunition), Signal, Chemical Warfare Service, Medical, and Ordnance automotive equipment and parts. Chief considerations in the establishment and operation of these dumps include: (1) a planned layout; (2) a location providing sufficient


ADVANCE BASE—SWPA
1] Includes S2, S3 & S4 Functions as required.
2] May include S1 Functions, War Bonds & Insurance.
BASE COMMANDER
EXECUTIVE OFFICER
1] 'S' STAFF
CONTROL BRANCH
ADMINISTRATIVE
SERVICES
ADJUTANT
2] GENERAL
AIR LIAISON
INFORMATION & EDUCATION
CHAPLAIN
FINANCE
HEADQUARTERS COMMANDANT
JUDGE ADVOCATE
PROVOST MARSHAL
SPECIAL SERVICES
COMMANDS
BASE PORT COMMAND
PORT COMMANDER
BASE MOTOR COMMAND
MOTOR OFFICER
BASE AREA COMMAND
AREA COMMANDER
BASE SERVICE CENTER
SERVICE CENTER COMDR
EXECUTIVE OFFICER
MAINTENANCE
OPERATIONS
STAFF
REPL. DEPOT
CAMPS
STAGING AREAS
WATER DIVISION
TRAFFIC DIVISION
ARMAMENT SECTION
BOARDING OFFICE
HARBOR BOAT SERV
MAINT
MARITIME PERSONNEL SEC
PIER SUPT
BASE CML SERVICE
BASE ENGR SERVICE
BASE ORD SERVICE
BASE MEDICAL SERVICE
BASE QM SERVICE
TC SUPPLY DEPOT
Base Engineer Executive Officer
Base Ord Officer Executive Officer
Base Sig Officer Executive Officer
CARGO MVMT
AIR TRANS
RAIL TRANS
TROOP MVMT
Base Cml Officer Executive Officer
Ord Supply Depot
Ord Service Center
Am Depot
Chemical Supply Depot
Cml Am Depot—Gas Yard
Chemical Service Center
Chemical Tng Center
Base Surgeon Executive Officer
Engineer Depot
Construction & Utilities
Land & Prop Officer
Engineering
Signal Depot
Communication
Pictorial Service
Professional Service
Hospital
Dispensaries
Malaria & Dengue Control
Laboratories
Schools
Supply Depot
Evacuation
Storage & Issue
Signal Repairs
1143M

area on reasonably hard standing, close to the dock area and along the main axial road; (3) storage sheds and dunnage—involves availability of prefabricated buildings, use of native labor and materials, and refrigerators (usually mobile); (4) construction of loop roads dividing the area into sections and turn-arounds and, in the case of the ammunition dump, a sorting area; (5) an orderly, systematic, and convenient warehousing plan; (6) a plan and SOP for rotating stocks and progressive inventory.

Port Facilities

As a good harbor is a primary consideration in the selection of a forward base, the problem with respect to it is entirely one of adequate facilities. Docks, jetties, anchorages, shore markers to guide landing craft, parking areas, load slots, sorting areas and platforms, loop roads to facilitate the smooth flow of truck traffic, telephone communication, latrines, transit and gear shed, and a conveniently located Port Operations headquarters building are the construction and installations required. Harbor craft and barges, cranes, and sufficient appropriate stevedoring gear are the major items of equipment. Pilferage and breakage are the chief menace.

The prompt turn-around of ships is the mission and objective of Port Operations. This requires around-the-clock operation, trained and experienced supervisor personnel, adequate skilled labor (winch operators and dock foremen), sufficient unskilled dock labor, an adequate number of trucks (including an emergency pool to meet unexpected demand—from station complement and stage troops), and a sound loading plan, with a view to maximum block loading, prepared in advance of docking and discharging without regard to sorting in the hold, where the ship is not block loaded.

Air Force

Aircraft operating against the enemy are established at a forward base as soon as possible following its occupation by our forces.

In addition, operational aircraft and signal air-warning units are assigned for defense of the base. Air Force units also are at times staged at a forward base. Normally, the operational and staged Air Force units include their own service establishments as well as the flight echelons. However, the receipt, temporary storage, and distribution of the five classes of supply are the responsibility of the base. In addition, Base Headquarters may, regularly or from time to time, be required to provide all or a portion of the services, including construction rendered ground troops.

Relations with the Air Force are limited to administrative and supply matters affecting the base, and assistance in coordinating the air, ground, and naval defenses.

Staged Ground Troops

The service of staged ground troops is, of course, the primary purpose of the base.

The chief services rendered them are, as indicated under "Specific Functions," (1) provision of appropriate and adequate staging and training areas, (2) assistance in debarking and embarking, and (3) supply. The relations between staged troops and the base organization is that usual between post and station commanders and the tactical units occupying the installation.

The reception and outward movement of casuals and replacements is a base function.

Use of Staged Troops

The directive to the Base Commander from higher headquarters concerning his responsibilities, or from the senior staged troop commander, normally contains the following: "CO, Base X, is authorized to request tactical units staged at Base X for troop labor as necessary."

In a forward area, it is both necessary and desirable to use staged combat troops to a considerable extent for base operations to augment the station complement: necessary, because of the continual acute shortage of service troops (they are required for task forces to develop newly-won territory quickly); desirable, because such a plan is economical of manpower using one man for two jobs instead of two men for similar successive jobs.

Habitually, elements of line combat troops, infantry and artillery, are used to unload ships, to store supplies in the various dumps, and to augment the island defenses. Staged troops also provide additional engineers, military police, trucks and drivers, and personnel to operate a casual camp. At one forward base with a station complement of approximately 4,000, and 40,000 staged troops, the divisions were called upon for about 1,200 men daily for such details. The commanders concerned were satisfied with the necessity and desirability of the procedure. Recollect that only one Liberty-type ship requires three crews of seventy men each, a total of 210, to discharge or to load it—exclusive of the supervision and technicians (winch operators, etc.) provided by the port companies.

The use of staged troops for labor details may appear to be inappropriate and wasteful, and to have an adverse effect on their morale. It is none of these if properly handled. The project is viewed as an essential feature of forward-area *training*. Its importance in taking care of the unit in combat when other troops are not available (a frequent condition) is emphasized. Stressed also is the value of first-hand knowledge and appreciation of transportation and supply problems, how these are met, and the difficulties involved in backing up the fighting front. Assignment to this special duty is rotated and scheduled. The fact that these duties are a part of their training, that they will be engaged in for a limited time, and that everyone in the division is getting such training will not fail to "sell" this service job to men who take pride in being fighting soldiers.

An important consideration in the use of staged troops is that organic tactical units be utilized for labor details. The advantage of control through normal command channels, direct contact between the base staff section heads with the responsible and knowledgeful commanders of the tactical units concerned, ease in issuing instructions and correcting deficiencies, and ease in conforming to unit training schedules is obvious.

The plan in effect at one base was to assign a battalion to the job of unloading ships (the average daily number of ships in the harbor was three); one company, generally the division reconnaissance troop, to island defense, outposts, and patrols; a company to operate the casual camp (prior to the establishment of a replacement depot); and a battery of field artillery for the base provisional military police company. The personnel (organization) provided for these details should not, as a rule, be varied in less than two weeks; otherwise the efficiency of the job is decreased materially. On the other hand, in order to fit these base jobs into the tactical training programs, staged troops should not be assigned to the base for a period exceeding one month.

In general, key men from Base Headquarters and from station complement troops are assigned to assist and supplement the tactical command furnishing the labor troops.

As indicated previously, staged engineer troops, either separate or assigned to divisions or task forces, are utilized to augment station complement engineer units to the extent necessary and practicable. They are first utilized in preparing their unit areas. When this work is completed, they are usually assigned main axial road extension and maintenance in the vicinity of the division or task force area; then assistance in other road extension and relocation and in bridge construction, and in the preparation of additional required staging areas. The last is largely a matter of building access roads, clearing camp sites, and establishing water points. Finally, if time and equipment permit, staged engineers are utilized to supplement and assist the work of the base engineer units in clearing, constructing, and maintaining supply dumps, dock and other harbor facilities, the operation of saw mills, and the operation of the engineer depot. It is apparent that these activities are essential training for the job to be done in developing the enemy territory their commands will seize.

Base operations are necessarily carried on throughout the twenty-four hours of the day. In this connection, experience indicates that the most efficient use of manpower is obtained by working three shifts of *six* hours each;

six on the job, twelve off duty. Under this plan, one shift is on duty twice in one twenty-four hour period every third day, but, over a three-day period, averages only eight hours per day. This procedure, as against three eight-hour shifts, has the advantage of (1) less fatigue and greater production while on duty, (2) eliminating breaks for meals (frequently, however, coffee or a cold drink and sandwiches are served during the middle of the shift to the groups successively taking a break—often by the Red Cross), and (3) varying naturally the time of day each shift is "on."

An excellent presentation of the effective use of staged troops as labor details is contained in AGF Board, SWPA report No. 53, "Fatigue Duty as a Means of Training."

Native Labor

Native labor is most efficient in the accomplishment of tasks not requiring the use of machinery, in supplementing equipment by hand labor, especially in inaccessible areas, and in supplementing or replacing troop labor. Habitually, tasks assigned native labor include: building native-type thatched-roof huts for headquarters, storage sheds, and, where the situation warrants, mess halls, and quarters for the higher echelons of command; cutting the tall, tough tropical grass (kunai) and otherwise clearing camp sites and training areas (the mites which live in the grass are a source of typhus and many precautions are required if soldiers work in the grass); assistance in road and bridge construction and drainage; malaria control activities, largely spraying oil and clearing and filling ruts and shallow pools; general labor—loading and discharging small ships and work in supply dumps; procurement of fish, wild hog, fowl, and native fruits; as guides; and, in the event of combat, as carriers. The work of native laborers is amazingly effective and rapid. Native buildings are constructed in about two days, using local trees. Poles are notched and fastened by tying with native "string" plants, with a consequent great saving in construction materials. If built of hard wood, these buildings will last a year.

It is important that all relations with natives be handled through the established local native labor organizations. In the Australian-controlled and Mandated Territories this organization is the Australian New Guinea Administrative Unit, commonly and normally referred to as ANGAU. Both at intermediate and forward bases and in combat, the officers and men of this organization and their efficiently trained "fuzzy wuzzies" have done a grand job and have made a priceless contribution to the successful prosecution of the war effort. (Observation: Things are "right" if they sing as they work—of course, not in the immediate combat area.)

It is important, also, that a definite section, and specified officers only, handle all contacts with the native labor organizations. Usually this is done by a section of the Base Engineer organization. All others are strictly forbidden to contact either the natives or the control organization. Native compounds and villages must be placed off limits and such regulations must be strictly enforced.

It is to be expected that staged troops will ask for native labor for a variety of jobs, some of which are more appropriately handled by organic troops. To the extent practicable—based on the number of native laborers available and the priority of tasks in which they are trained and most proficient—such requests are granted. Care must be taken, however, not to accept requests for a specified number of natives nor for the "assignment" of a native gang. The staged unit commander requests of the Base Engineer the accomplishment of a specific job by native labor, indicating its nature, location, and desired date of completion. The Engineer includes the project in his weekly program discussion with the ANGAU (or other territorial organization) liaison officer who advises (1) whether the job is appropriate and timely in view of priorities and the overall program, and (2) the number of laborers required and available, the manner of accomplishing the task, and the estimated date of completion.

Problems

Looming large among the problems en-

countered in the operation of a forward base are:

1. Rations.—The proper rotation of stocks is a primary consideration in ration storage. The great problem with respect to rations, however, is obtaining and distributing perishables to the troops—fresh meat, vegetables, and fruits. The receipt of perishables from supply bases is governed almost entirely by the amount of reefer (refrigerator) shipping space available, which in turn depends upon the number of reefers, the relative priority of their destination, and the distance of the latter from the supply base. Local distribution is dependent on the number of stationary and mobile reefers available at the base ration dump and the number of trucks available. Units are not provided with the means for retaining perishable foods; they are consumed on issue.

In this connection, two mobile reefers in a landing craft (LCM) shuttling between a supply and forward base, where the distance does not exceed 120 miles, prove a valuable adjunct to the regular reefer ships. Occasional shipments by air are also utilized.

Fresh fruit may be obtained periodically by dispatching trawlers of the harbor craft fleet to near-by native villages. Approximately ten tons per trip of bananas, pawpaws, lemons, oranges, and pineapples may be obtained on such trips if prior arrangements are made.

At one forward base an experiment with a chicken farm for the production of fresh eggs, primarily for the hospitals, was tried. Of a shipment of 2,400 hens, three quarters of which were not of laying age on arrival, 1,900 survived the respiratory diseases contracted during the voyage, the rainy season, the normal disease incidence, and some predatory animals, to attain, after twelve weeks, a production of 640 eggs per day.

2. Pilferage in the holds, on the docks, on the trucks en route to the dumps, and in the dumps themselves. Military police in the holds, on the gangplanks, and on the docks; depot checkers on or following each truck or convoy; careful checking and posting of sentries at the ration dump; and prompt punishment are required to prevent this wasteful evil. While rations, tobacco, clothing, alcohol, and personal baggage are the preferred items, strangely, soldiers will pilfer everything, whether or not it is of any conceivable use. Breaking cases by rough handling must in particular be guarded against, and sentries must be especially wary of soldiers leaving the ship in the new clothing conveniently exchanged for the poorer items they wore aboard. Brief talks by commanders, and posters indicating the great interference of pilferage with the war effort, also assist in reducing the evil.

3. Motor maintenance.—With twenty-four hour operation, a normal shortage of trucks, overworked drivers, night driving, poor roads, and the usual lack of responsibility for the protection of government property which bedevils forward areas, motor maintenance, especially first echelon, must receive the constant attention of all commanders if the deadline is to be kept below an excessive proportion of vehicles assigned. The prescribed periodic checks, 1,000 and 6,000-mile, must be halved, at least. It has proved effective to put in the shop five percent of all operative vehicles daily for a thorough check by trained mechanics whether or not they appear to need attention. Motor maintenance is most important and requires constant and unremitting attention.

4. Sufficient motor drivers.—The T/O's of practically all truck companies comprehend, apparently, only eight-hour operation. The necessity of round-the-clock operation produces, obviously, a considerable shortage of drivers. This has been supplemented in three ways: (a) by borrowing, on SD, from service, depot, engineer, and staged units; (b) by working drivers on two twelve-hour shifts (dangerous and inefficient); and (c) by calling on staged troops for trucks and drivers.

5. Roads.—It is impracticable, and, because of the unpredictable and limited time most bases are occupied, inefficient and uneconomical to build good all-weather roads. Con-

sequently, road and bridge repairs are a constant problem in the rainy season, and even during the dry season when the terrific volume of rapidly rushing water caused by a "flash flood" from the mountains tears into and over the flimsy man-made conveniences.

6. Good relations with staged troop commanders.—The problem of providing a maximum service to staged troops while adhering to construction, supply, and administrative directives and regulations is apparent; especially as the staged troop commanders are invariably senior to the base commander and imbued (rightly) with the determination to do anything and everything which will contribute to the success of their combat mission, no matter what the book says. Tact, patience, resourcefulness, imagination, initiative, common sense, intelligent interpretation, and especially a sincere desire to be of service will relieve most of the base commander's headaches. It may be well to realize that most men are reasonable and that even the unreasonable are reasonable some of the time! In short, the staged troops are the base commander's chief—and only—customers. They must be served, and served well.

7. Enforcement of regulations.—Again, it is characteristic, unfortunately, that troops in a forward area will let down the good habits and discipline they have been so thoroughly taught in training centers and during the unit training periods. Failure to wear clothing as prescribed to prevent disease, to sleep under mosquito nets, to drive within prescribed speed limits, to maintain motors properly, to conserve motor transportation, to clean and properly care for arms and equipment, and unauthorized promiscuous firing are the chief violations. Military courtesy and a military appearance and posture, which as a reflection of good discipline and esprit are perhaps even more important in forward areas than in the rear, tend to be almost entirely neglected. The answer is simple, if difficult; issue few orders and regulations and only such as can practicably be enforced; enforce them vigorously, tirelessly, and continually; hold commanders responsible for the infractions of members of their organizations.

8. Indiscriminate dumping and poor police.—Unless frequent inspections are made, prompt corrective action taken, and the attention of higher commanders called to deficiencies, refuse will be scattered all over the area. Creeks (often above water points), draws, woods, the sides of little-used or temporarily abandoned roads, unoccupied bivouac areas, and other such spots are favorites for this unsanitary practice. A well-planned, adequate, and simple procedure for refuse disposal by incineration, burial, and dumping at sea, supervised by base personnel, will contribute in a large measure to reduce the evil.

9. Building and maintaining the morale of service complement troops.—This is almost entirely a matter of selling the importance of the job, setting high standards, and appropriate commendation. Varying assignments to the extent practicable, training in alternate jobs, an occasional ceremony, some range firing, facilities for popular entertainment, relaxation, competitive sports (boxing, baseball, and swimming particularly), and a fair leave and furlough policy contribute materially to a high morale.

CONCLUSION

The success and effectiveness of forward base operations depends, as does that of tactical operations, on:

1. Personal reconnaissance.
2. An estimate of the situation in view of the mission and the personnel, material, and ground available.
3. Careful and thorough preplanning.
4. Constant, energetic, and observant supervision.
5. Resourcefulness and flexibility in meeting new and unusual situations.
6. Economy of time, space, and effort.
7. Continual follow-up of action taken and of directives and orders.
8. The determination, vigor, enthusiasm, and initiative of the commander.

Experiences with the 36th Division in Italy

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MY overseas service has been with the 36th Division and I would like to outline to you the operations in which that division participated in Italy from the landing at Salerno on 9 September 1943 to 25 June 1944 when it was relieved after having reached a point approximately twenty miles south of Livorno. During this period, the division was engaged in many varied types of operations.

The landing at Salerno was opposed by German forces which were waiting on the beaches for the American troops to land. Later, the division was assigned to a mountain sector which required it to operate on mountains as high as 4,000 feet, where there were no roads or trails. Following the mountain operations, the division was assigned the mission of crossing a river which formed the principal obstacle of German organized position. Later it made an attack to envelop Cassino and withstood one of the most severe German counterattacks that was made in that sector. Finally, the division was sent to the Anzio beachhead where it conducted an infiltration and envelopment maneuver which broke the German defenses east of Rome. It then pursued the retreating German forces through the city of Rome and beyond to the point where it was relieved south of Livorno. This pursuit covered a distance of 240 road miles, during which some 5,000 German prisoners were captured.

During all of these operations, the 36th Division was re-enforced by a battalion of tanks, a battalion of tank destroyers, a battalion of antiaircraft artillery, and a battalion or less of chemical troops. Almost every type of operation that is mentioned in our training manuals was experienced by some of the units at one time or another throughout this long period of operations.

During the planning period for the landing at Salerno, it was known that a German Panzer division was in the Salerno area or near to it, and that it would most probably be encountered on the beaches. Therefore, in planning the schedule and priority of landing, it was necessary to arrange to have ashore, prior to daylight, artillery, antitank guns, and tanks, all for the initial and primary purpose of combating any German tanks which might appear. In order to get artillery and antitank guns ashore, they were loaded in DUKW's on landing craft so that they could be launched into the water and go ashore under their own power during the night. The arrival of these antitank guns and artillery units on the beaches at about daylight made it possible to destroy many German tanks which were seeking to drive the first troops to land back into the sea. I would like to emphasize at this point that in any landing, or for that matter in any attack which involves armored opposition, antitank weapons in the form of tanks, tank destroyers, or artillery must give close support to the leading infantry companies. The antitank weapons provided for infantry units are not sufficient for complete antitank defense. Enemy armor must definitely be stopped before it can enter the area occupied by friendly infantry.

At Salerno, throughout the major part of the operations, tanks and tank destroyers were used defensively. They were kept concealed in the rear of selected firing positions and moved up into the firing positions when observers discovered suitable targets. After firing, they were immediately withdrawn to concealment again.

Due to the fact that the front was so wide that it could not be covered entirely with infantry, it was necessary at times to assign armored and reconnaissance units to cover intervals defensively between infantry defense areas. This was not an ideal employment of armored or reconnaissance units, especially at night, but under the circumstances they were the only units available for the purpose.

At Salerno, the Germans used their tanks offensively in groups of from five to ten. The terrain in that area was not entirely

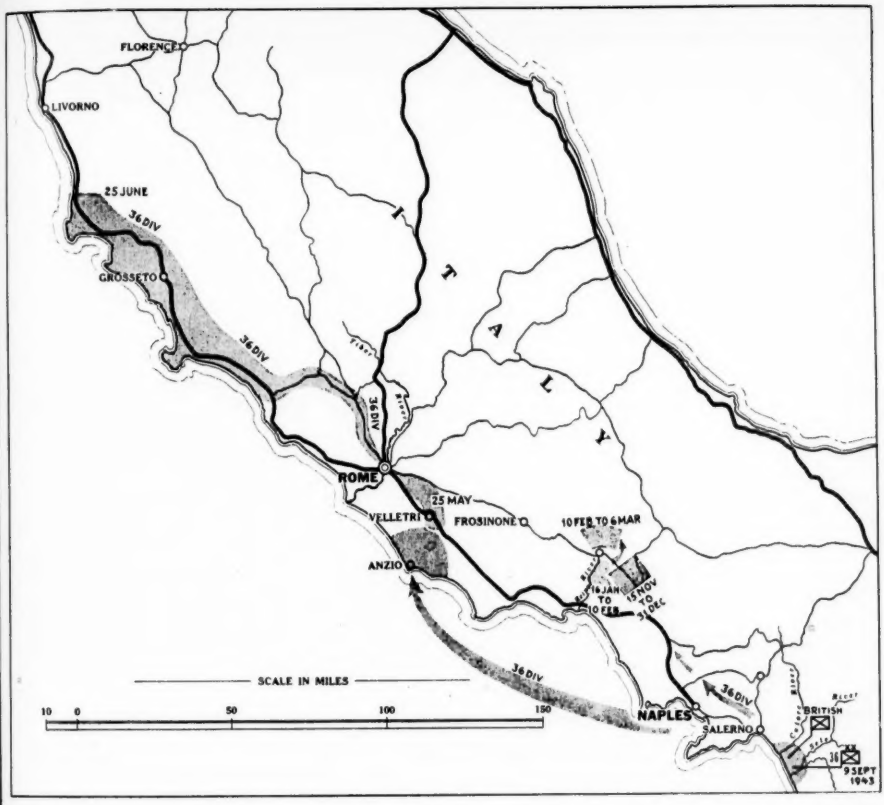
suitable for tank action in masses. There were many streams, ditches, stone fences, and railroad embankments which limited tank action to small areas. In fact, we encouraged the German tanks to move out to attack us while we kept our own antitank weapons ready in concealed positions. As a result of this method, we knocked out sixty enemy tanks and lost only seven tanks of our own. After our leading infantry units had reached the foothills of the mountain range, the tank action by the Germans was restricted to certain very evident corridors, and these were easy to defend with our antitank units. We found here that our artillery could disperse tanks by artillery fire and could occasionally knock one out, and we used our artillery to drive the German tanks from concealed positions out into the open where our antitank guns could get at them. We also learned here that friendly artillery observers can mistake friendly tanks for enemy tanks in spite of the identifying marks upon them.

After Salerno, the division was assigned a mountain sector on a front which had been organized for defense by the German troops. The weather at this season of the year was bad. Rains were almost constant; there was no shelter; the men were wet to the skin night and day; the mud was deep; the nights were cold. There were no suitable trails on the mountains that could be used by the troops. The problem of supplying troops with food, water, and ammunition was a difficult one. In some instances, one entire infantry battalion had to be detailed to carry supplies for another battalion. It required hours of climbing over difficult slopes to make the trip from the base of the mountains to their summits. The evacuation of the sick and wounded was also a difficult problem, and in some cases as many as eight hours were required to carry a wounded man on a litter down the slopes to an ambulance. It was impossible to furnish hot food. Later, during periods of no rain, the troops were limited to one canteen of water per day. These conditions of service were real hardships, hardships which have never been exceeded by soldiers of the United States Army anywhere. Yet, in spite of all this, our men maintained a cheerfulness far superior to that of their enemy.

Under these conditions an attack was made by the division upon the German positions. One regiment scaled a mountain mass at night during a downpour of rain, in complete darkness under artillery fire. It was impossible for one to see. Yet those troops managed to find their way to their objective across those unfamiliar mountain ridges in complete blackout. The Germans were completely surprised; many prisoners were taken.

In these mountain operations, it was necessary to employ improvised pack trains hastily assembled. The personnel came from the infantry combat troops. The pack trains would receive the supplies at the point of farthest advance of vehicles and would carry the supplies forward as far as the mules could go. From there, the supplies had to be carried forward by men. There never were enough mules, so that some of the supplies had to be carried from the point where they were unloaded from the vehicles all the way to the top of the mountains by the men themselves. In these mountain operations it was not practicable to use armored vehicles except to guard certain corridors for the purpose of breaking up any German counterattacks which might be made.

After these mountain operations, the division was given the mission of forcing a river crossing at night in front of a defensive position on low ground which was overlooked by German artillery observers on high ground on both flanks. If the crossing was to be a success it would be necessary to have the armor across the river by daylight to operate with the infantry. But bridges could not be built across the river because the approaches to the bridges had to be made over muddy lowland which was mined and which was within the normal barrage area of the German artillery and machine-gun fire. Neither trucks nor tanks could operate near the designated bridge sites. Smoke was used to conceal our movements during daylight but it was ineffective and the attack failed.



The next operation was in the area northwest of Cassino in an effort to capture that locality. Here there was some confusion. Either because they could not read maps or because they could not definitely locate themselves on the ground, commanders reported their units on certain localities when as a matter of fact they were on other localities. This made it difficult to plan artillery and air support, with the result that some of our own troops were occasionally bombed and fired upon by our own artillery. On the morning of 12 February the Germans undertook to recapture the high ground northwest of Cassino. After an artillery preparation of two and a half hours they launched a strong counterattack of several battalions. The attack failed, but only after various localities on the position had been lost and retaken.

In May, the 36th Division was transferred to the Anzio beachhead where it was placed in reserve. After the first few days of the offensive launched by the forces of the beachhead, the 36th Division was assigned the mission of capturing Velletri, a strongly organized locality on the German defensive position. Intelligence reports indicated that the Germans were not holding in strength the wooded hills north of Velletri. It was decided to break through on that front, occupy the hill mass beyond, and capture Velletri

from the flank and rear. Under cover of darkness the entire division sector was taken over by the 36th Engineers and the division was quickly transferred to the right. All three infantry regiments, all the division artillery, and two companies of medium tanks moved through a gap 1,000 yards wide made in the German line to a position in the rear of the German defenses. This infiltration was known to the Germans but they thought it was made by not more than a battalion of infantry.

The hill mass was covered by brush and vineyards; there were no roads. The vegetation was so thick that the range of visibility was only about thirty yards. A passage for the tanks was made by several bulldozers moving in column one behind the other, each adding a foot or more to the width of the road. The tanks followed the rear bulldozer. The division artillery followed the tanks. A part of an infantry battalion protected the column. The purpose of building this tank trail over the hills through the woods was to make it possible to have tanks with our infantry when the infantry should emerge on the far side of the hill mass.

After the infiltration had been accomplished, the German defenses around Velletri were captured by an encircling movement which struck the positions from the rear. This encircling movement was made through brush by infantrymen who were opposed by a German reinforced parachute regiment. The Germans fought desperately. They wore camouflaged clothing, wrapped branches and grape vines around themselves, lay down in the brush, and waited for our men to come into view. They would then fire upon our men and run back some fifty or sixty yards and lie down again to repeat the same procedure. This would have made the going very costly for us if it were not for the fact that our men would fire into the brush at anything that could conceal a German sniper. This method used up a lot of small-arms ammunition, saved a lot of our men, and resulted in killing and capturing many Germans.

The German paratroopers in this sector were young men who were well led. But after a day or two, groups of them became isolated, lost, and surrounded, and many of these surrendered voluntarily. They were reinforced by improvised units hastily assembled from clerical personnel, replacement centers, hospitals, schools, and stragglers. The capture of Velletri broke the German defenses east of Rome and prepared the way for the German retreat. From here the division pursued the disorganized German forces to Rome and beyond.

At first the Germans employed small task forces consisting of infantry, artillery, tanks, and antitank guns to delay our advance along the roads. They would take up a position in a suitable locality, force our troops to deploy, and then they would retire, sometimes by day, sometimes by night, to the next position in rear. By these methods they were able to slow our advance. They were not always able to blow up bridges before we could obtain possession of them. On many occasions the Germans had prepared defiles and bypasses for the placing of mines but did not succeed in installing the mines prior to our arrival. Delaying detachments of the type I have just described defended the entrances to Rome throughout the afternoon of 4 June. After dark, they retired through the city to the western exits where they resumed their delaying tactics. Occasionally, the German forces organized strong delaying positions and it was necessary to deploy the whole division to clear the way. However, the German forces were in a state of confusion, units were intermingled, their communication was difficult, and they were at a great disadvantage. In their retreat through Rome they were exhausted, dirty, discouraged, straggling—they had lost much of their will to fight.

The 36th Division went through Rome beginning at 0200 on the morning of 5 June. In order to get the whole division through the city, infantrymen were seen piled on top of loaded trucks, on the gun tubes and trails, on radiators, in fact on anything that would carry them. As many as seventeen infantrymen rode on a jeep with a ¼-ton trailer,

and six men rode on a 105-mm howitzer. The vehicles were somewhat overloaded, but the whole division was west of Rome by noon on 5 June.

As the advance continued north of Rome, the difficulty of supply for the division increased. Extreme measures were adopted to make transportation available for the supply of the division over the long distances the trucks were required to go.

As the advance continued north of Rome, bands of Italian guerrillas became more and more active. They operated in the hills, and whenever they could find a small group of isolated Germans they would either kill or capture them. The Italian guerrillas also protected and assisted escaped Allied prisoners of war. They were of material assistance in giving us information regarding the strength, equipment, and movements of certain retreating German units. I observed that the fighting spirit of the Italians increased as our advance moved northward.

From time to time mechanized cavalry reconnaissance squadrons were attached to the division. It was found that best results could be obtained only when infantry platoons, engineers, and artillery were attached to these reconnaissance squadrons. This grouping was habitual thereafter in the division. When armored cars were stopped by antitank guns or by the terrain, the infantry and engineers would take over and clear the way for further advance. On one occasion our reconnaissance squadron was opposed by a German reconnaissance squadron mounted on bicycles and horses. The German squadron was discovered by one of our artillery air observers and he was able to adjust fire on their horses with great effect from our artillery with the reconnaissance squadron. This observer told me later that to direct artillery fire on those beautiful horses was the hardest task he had ever had.

Throughout these operations in Italy, one had to be alert to detect German mines. Every soldier should know how to search for and remove mines of all types. The Germans have a variety of antipersonnel mines, but in Italy only about five percent of the mines encountered were of plastic or wood. The Germans have the habit of placing antipersonnel mines in areas where our troops may be expected to bivouac. Many of our soldiers have had their feet blown off by these antipersonnel mines. Occasionally a vehicle will run onto a mine in a most unexpected place, so it is necessary to be constantly alert. Most vehicles were provided with sand bags or steel plate protection. This helped to reduce casualties.

One of the common complaints of commanders of units in Italy is that too many officers and men wait to be told what to do next. It is my opinion that an infantry battalion, or any other combat unit, is not properly trained until every officer and man in the battalion can do his proper part over a considerable period of time without orders. Commanders in battle cannot be everywhere —and some become casualties. Although the commander should be where he can exercise the maximum control over his unit, his control is exercised more as a result of previous training and habits than by direct influence or action in battle. Just as a member of a football team acts on his own initiative as soon as the ball is passed, the crew-served weapons, the rifle units, the security elements, the communications personnel, the medical personnel, and others must all act together as a team on their own initiative without orders after an attack begins, but *always* in conformity with the commander's plan. This requires training, is not difficult, and should be the objective of all unit commanders. When a play for a football team is called, every member of the team knows what to do and does it because that particular play has been practiced over and over again. So it should be with various types of combat units. Practice the same operation over and over again until every man has learned what he is to do and how he is to adjust his job to the terrain and formation.

Many commanders and staff officers do not appreciate the necessity for time to assemble the troops and equipment, to make necessary reconnaissances, to prepare and issue orders all down the line. As a result,

orders are sometimes impracticable. At midnight they direct a dismounted patrol to go out at once on unimportant missions; they order attacks to be made by specified units, in a specified manner, within impossible periods of time; they draw incorrect conclusions regarding the strength, morale, or intentions of the enemy. This does not help the morale or self-confidence of the troops who do the fighting.

When we first came in contact with the Germans, we had the feeling that artillery fire could destroy or neutralize a defensive position. It was thought that artillery concentrations on defensive positions where determined troops are well dug in could demoralize the defenders and permit our infantry to rush in closely on our artillery concentrations to capture the position. This does not work in practice except occasionally. One of the best methods of attacking a defensive position is by use of infiltration at night. When artillery can catch personnel above ground, not well dug in, the destructive effect of artillery fire is great.

In many cases, Italian villages were destroyed by our artillery in an effort to dislodge Germans known to be in the town. This always proved to be ineffective since the rubble was just as good cover as the previous buildings. Many helpless civilians were killed. The proper way to take a town or other organized locality is to bypass it and envelop it from the rear whenever this is possible.

To use tanks to attack a prepared defensive position is costly. Eleven of our tanks were burned up within a small area near Cisterna. They were all knocked out by two well-concealed German antitank guns. Our tanks were moving forward out in the open field and the German gunners had a picnic knocking them out one by one.

I have heard the comment made by other division commanders that enlisted replacements are not satisfactorily trained prior to arrival in the theater of operations. I have not found this to be the case. Enlisted infantry replacements have been satisfactory; however, I have found it necessary to give them an orientation course prior to placing them in battle. Replacements for other branches within the division do not need an orientation course, but it is a mistake to send infantry replacements direct to units on the front line. The orientation course used in the 36th Division included such subjects as small-unit problems, firing of weapons with which the men are armed, battle drill to develop teamwork, and patrolling under various conditions. This training is conducted by officers and noncommissioned officers from the companies to which the replacements are assigned. The instructors later become the leaders in battle, and this develops confidence on the part of the replacements in their leaders. A proper orientation course can be given in three weeks. The subjects are all review for the replacements, but by going over them as a refresher course under leaders who will be with them in battle, they acquire confidence in themselves and their leaders. This self-confidence is very important during the first days of battle. This same procedure is also suitable for other types of divisions. During the pursuit of the Germans north of Rome it was impossible to obtain suitable tank crew replacements, although the tanks were available.

Rotation of personnel as applied in the 36th Division is, in general, satisfactory. It is necessary, however, to give priority to individuals who are beginning to weaken under the strain of battle, to those who have been wounded a number of times, to those who have been decorated, to those who are physically run down yet not sufficiently so to permit their being evacuated through medical channels. Hence, many of those sent home on rotation are not qualified for strenuous duty upon arrival in the States. Nor are they suitable as replacements to be sent back to theaters of operations.

I have observed our soldiers in battle on the Italian front over a period of some ten months and I am convinced that our soldiers are better than those of the Germans. They are more cheerful, more confident, better marksmen. After having seen our soldiers going through the hardships of last winter,

during which they were subjected to almost continual rains, mud, cold rations, and intermittent artillery and mortar fire, maintaining a cheerfulness far superior to that of their enemy, I feel confident that they are capable of being made into the best soldiers in the world.

Artillery liaison within the 36th Division was organized as follows: With each infantry battalion are two forward observation groups and one liaison group. These observers and liaison officers are furnished by the artillery battalion which habitually works with the infantry regiment. The forward observers operate directly under the liaison officer and are habitually forward where they can see the location of their own troops as well as that of the enemy. They are constantly alert twenty-four hours of the day for targets, and bring down concentrations on their own initiative. The forward observers work closely with the commanders of the units being supported. In addition, it is the practice to maintain two observation planes in the air at all times during the day to pick up targets which might not be visible to the forward observer. These air observers also bring down concentrations on targets which they discover. By using this method, suitable artillery targets are quickly disposed of. I do not now recall a single case in which any German counterattack was made in the sector of the 36th Division without having been blasted by artillery fire. The infantry of the division is very proud of its artillery support and always speaks enthusiastically regarding it.

An engineer reconnaissance party is always present with the leading infantry battalions. Engineer equipment is kept well forward in order to prepare bypasses for jeeps quickly. It has been found that all the needs of the front-line infantry battalion can be taken care of by jeeps with trailers operating between the battalion train bivouac and the forward positions.

Because of the difficult terrain, mountains and brush, and inability to get transportation forward, it is necessary at times to provide extra litter bearers in addition to those provided by tables of organization. It is also necessary at times to provide men for carrying supplies forward on their backs, to provide additional members for the military police, and to augment signal communication personnel for laying wire nets over difficult terrain where vehicles cannot operate. The present tables of organization for a division provide only for the normal requirements, and when additional personnel is needed for the purposes indicated above, it is necessary to take them from the combat units. This is not satisfactory, but it is necessary at times.

The present system of decorations is satisfactory. However, from a viewpoint of a division commander, it is desirable that divisions be given a monthly quota of Legion of Merit awards. This has been done recently in Italy and is satisfactory.

The motor transportation now authorized for a division is satisfactory provided corps and army will furnish additional truck transportation whenever the division is required to move. Otherwise, the mobility of the division is reduced.

I have had considerable to do with armor in Italy and I find that most officers in armored units contemplate their use under conditions of a breakthrough. This, of course, is the ideal; however, the Germans are clever in maintaining a continuous front and take special precautions to defend areas suitable for tanks. Therefore, the conception that tanks are to be used only for a breakthrough does not fit in with the conditions as they exist. Armor in general must work with infantry as a team, and where this has been done the best results have been obtained. Under these conditions it has been found that a group of five tanks and five tank destroyers are all that are necessary to work with an infantry battalion. It is therefore uneconomical to line up long columns of armor when only a relatively few of the leading vehicles can be profitably employed.

I believe that too many of our combat unit commanders search for the ideal situation in battle, and because they do not find this they are disappointed and feel that they can do little. I have frequently been told by com-

manders of tank, antitank, chemical, air, engineer, and other units that in a given situation conditions are contrary to their best tactical employment. This, of course, is true, but unit commanders should understand that ideal tactical conditions for employment of units in battle are seldom realized and they must learn to work under handicaps as the normal.

I have noticed a material lowering of the morale and fighting qualifications of the German soldier since December 1943. Prisoners taken recently have been willing to talk freely. They admit that they have lost the war. In most instances, they are delighted to be captured and to be out of the war. This condition is general throughout Italy and indicates a condition which should result in a sudden and complete break in the German resistance, when the break comes.

I have often been asked what should be the strength of infantry patrols to be sent into the enemy area. This depends entirely on the mission, the qualifications of the members of the patrol, their previous experience, the views of the patrol leader, the equipment available, the period of time the patrol is to be absent, and the character of the terrain. It is very important, however, that directives for patrolling be in possession of the battalion commanders at least two hours before darkness, in order that the necessary warning orders may be issued and reconnaissances made before dark. Attempts to organize patrols after dark have turned out almost always to be a failure due to the fact that it is difficult to assemble experienced personnel after dark and difficult for patrols to keep themselves oriented at night unless they have had an opportunity to check certain key terrain features and routes during daylight. In general, the best weapon for men on patrol to carry at night is the tommy gun.

Prior to the offensive at the Anzio beachhead, our air forces carried out a program of destruction of railroads and highway bridges north of Rome for the purpose of isolating the battlefield. They did an excellent job. There were no trains moving on any of the railroads north of Rome, and all the important bridges on highways were destroyed. The Germans had constructed some bypasses which we were able to use during our advance. There has been a special effort made to provide close air support for the infantry in Italy. I have come to the conclusion that our own close air support should be restricted to areas beyond the range of our own medium artillery. Our artillery forward observers on the ground and our air observers are able to discover targets within the range of our artillery and can quickly bring concentrations upon them. There are many who believe that bombing from the air can destroy sections of a defensive position, especially towns and pillboxes. This is true to some extent, but Cassino remained in the hands of the Germans even after it had been completely destroyed by our bombers.

Sources of information regarding the enemy were: prisoners, aerial photographs, infantry, patrols, civilians, air reconnaissances, and our own artillery observation posts. All of these sources of information are important, and when properly employed are sufficient to give a commander very accurate knowledge of the forces in his front, their strength, their disposition, their equipment, and their morale. It is necessary, however, to have skilled interrogators who can evaluate information received from civilians and prisoners.

Time is always important in battle. Too many commanders of smaller units do not appreciate this. On many occasions, when commanders were assigned missions which required prompt action, they were unprepared. Their command was not in hand, personnel was not assembled, vehicles were not properly serviced, communications were faulty, and supplies had not been issued. Inexperienced commanders desire to be warned of impending operations, but this is not always possible, and good commanders keep their commands in hand, prepared and ready for action on short notice. On many occasions I was greatly disappointed when I found I could not take advantage of an opportunity to cut off or isolate German troops because com-

manders to whom I had to assign the mission were unprepared to act promptly.

Throughout all of the operations in Italy an effort was made to hold out, in reserve, portions of all units so that they could be able to obtain some rest. In the case of infantry regiments this was done by rotating the battalions in reserve. In the case of tank and tank destroyer units it was done by rotating platoons on front-line duty. During the rapid advance north of Rome it was the practice to permit infantry battalions to remain in reserve for twenty-four to thirty-six hours. They were then transported by trucks, when possible, to the front line to pass through other battalions and take over the advance. Men who became exhausted in battle were sent to the service train bivouac of their units where they were allowed to rest several days before they were sent back to their units.

The collection and burial of the dead was handled by each unit. In each infantry regiment an officer, two noncommissioned officers, ten enlisted men, and two trucks were detailed to collect and transport the dead to the cemetery. Every effort was made to avoid temporary burials. Special pains were taken never to report a man killed in action unless it was known definitely that he had been killed. In cases of doubt he was reported missing in action until further investigation could be made. Special precautions were taken to insure that all individuals carried the required identification tags, but we found that it was necessary to mark items of clothing in addition to the identification tags. After this practice was inaugurated there were very few unknown buried dead in the division.

The Unsatisfactory Equipment Report

Released by the Director, Maintenance Division, Army Service Forces.

HEADQUARTERS officers in the Technical Services, responsible for the improvement of all equipment, say that officers in the field are not taking fullest advantage of the Unsatisfactory Equipment Report. They wonder how many of the men in position to observe the daily performance of matériel simply never heard of the form, and how many are just lax about using it. The form in question is WD, AGO Form 468, reference TM 38-250 and Circular No. 4, WD, 1944.

The Unsatisfactory Equipment Report form provides a convenient and easy way to report on any unsatisfactory equipment to the Chief of the proper Technical Service. There is space for complete identification of the equipment, its length of service, description of the trouble, its probable cause, description of any remedial action taken and recommendations for eliminating the difficulty.

As stated in the instructions on the form, it is to be used for "reporting manufacturing, design, or operational defects, and for use in recommending modifications of matériel." It is not used "for reporting failures, isolated matériel defects, or malfunctions of matériel resulting from fair wear-and-tear or accidental damage."

Unsatisfactory Equipment Reports provide the most important and reliable means of finding out the real worth and performance of Army equipment. They convey vital information from the field. Sometimes they lead to only minor changes, but these improvements in the aggregate are of enormous importance.

Army equipment is subjected to accelerated tests before it goes into service. But these tests cannot provide the information that may be derived from extended experience under field conditions.

"You have good equipment" say the men at headquarters to the men in the field. "But if we do not have your reports and recommendations, we cannot make the modifications and improvements that should be constantly in progress."

Ground Force Uses of Aerial Photography

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DEVELOPMENTS of the present war have enabled armies to make penetrations as great as fifty miles during one day of offensive action. Much credit has been given to the new facilities which have been placed at the disposal of the Plans and Operations, or G-3 Staff Sections. But how much consideration has been given the other phase of this development? How much consideration and recognition has been given the developments that have enabled the Intelligence, or G-2 Staff Sections, to keep abreast of the enemy situation? As a matter of fact, very little has been written on the subject, and in no field has the advancement been more rapid or of greater scope.

This advancement has been largely attributable to the development and extensive use of the aerial photograph. Much progress has been made in the development of methods for obtaining and producing the photographs themselves, but of greater importance has been the advancement in the techniques of making use of the photographs after they are produced.

Aerial photography is used by engineer units in the production and revision of maps. Theater engineer troops are capable of making topographic maps with this source of information alone. Distances and azimuths will be somewhat inaccurate, and to correct this fault access to some ground survey must be had to obtain horizontal control data. Once the basic control has been established, terrain contours can be drawn with Multiplex equipment developed for this purpose. Multiplex equipment, however, requires highly skilled operators. It is usually found only in the zone of interior and in the highest echelon of theater engineer troops.

Although engineers are at times called to produce maps for the ground forces of territory previously unmapped, such cases are the exception rather than the rule. In the Mediterranean and European Theaters where the most extensive operations have taken place to date, several series of old maps and some good ground survey data have been available. The chief task has been to revise and bring up to date the material found on existing maps. This, in itself a tremendous job, could not have been accomplished without the information obtained from aerial photography.

It is often contended that mosaics composed of a series of photographs might be used in lieu of maps in areas where usable maps have not been obtained. Although this is true, such use is seldom advisable. Experience in the Mediterranean Theater has shown that if large quantities of maps are needed for distribution to lower echelons, theater engineers can produce maps from photographic information faster than a comparable number of accurate photographic mosaics could be produced. It might be added that making of maps would be less expensive in use of manpower and materials as well as time.

In addition to aiding in the production of maps, aerial photography is used by staffs in their planning of offensives, invasions, and amphibious operations. A major portion of the intelligence information necessary for accurate planning is obtained from aerial photographs. When preparing maps and overlays of enemy defenses, staffs of the Mediterranean Theater have made a practice of indicating information from aerial photographs in red and information from other sources in purple. As a rule, about eighty percent of the information is in red.

The job of extracting intelligence information from an aerial photograph is not a job for an ordinary member of the G-2's staff. It is a job for a specialist—a photo interpreter. It is specialized to the degree that one group of photo interpreters works only on coast defense guns, another on antiaircraft guns, another on tank obstacles and wire, another on communications routes and port facilities and their capacities, and another highly specialized group appraises the beaches as to firmness of soil, slope of the beach out to sea,

depth of water, and location of reefs, sand bars, and underwater obstacles. Information comes to the staff on these subjects from other sources such as agents, refugees, escapees, prisoners, etc. Such information is often of doubtful value and the photo interpreter is called on to verify the information. In fact, the verification of information received from other sources is an important phase of his work.

Intelligence derived from aerial photography is especially important to a staff planning an amphibious operation. In such a situation the lack of contact with the enemy limits the operations of patrols and agents, and the taking of prisoners. Aerial photographic reconnaissance is the only agency which can supply complete, current, repetitive, and reliable information. The importance of repetitive information should be stressed for it is through the comparative study of a series of photographs of the same area that shifted, new, and camouflaged defenses are discovered and evaluated.

In addition to the information on approaches, beaches, defenses, and communications that the planning staff gets from its interpreters, there are actual photographs and mosaics to supplement their maps for picking the exact points for landings or main attacks. Terrain models can be constructed from photographic information and panoramic strips can be made of oblique pictures taken from elevations of 200 to 2,000 feet which give the staff a more accurate picture of the beaches and their approaches. These are of particular value in amphibious operations across large bodies of water when staff and troops commanders cannot make a personal reconnaissance of the area.

The role of the aerial photograph does not diminish when the planning phase of an operation is completed. On the contrary its scope is enlarged. Although there must continue to be a group of interpreters searching for information of defenses in an area far to the rear of the initial line of contact, the major portion of the interpretation job during the execution phase of the operation will be with the troops in the field.

The percentage of the total intelligence obtained from aerial photography decreases as prisoners of war become available and patrols become active, but the volume of such information increases and its uses are more varied.

Prior to H-hour for an amphibious operation or an offensive over difficult terrain, the troops are normally supplied with the following photographic material covering the area of contact:

1. Basic cover.
2. Communications strips.
3. Uncontrolled mosaics.
4. Panoramic oblique strips.

Basic cover is cover of the area to the front of a unit. The depth to which the cover extends depends primarily on the size of the unit. The cover for an infantry battalion may extend in depth only a thousand yards or so; for the division it will probably extend to about 10,000 yards. The units of the division use the photographs primarily as map supplements. In addition to the staff's uses of the photographs as map supplements, photo interpreters in the division headquarters extract a great amount of detailed intelligence from them. The information extracted is used not only by the staff but also by the infantry, artillery, reconnaissance, and engineer units of the division. For any photographic cover to be of appreciable value to the interpreter, it must be stereo cover. That is to say, each area or point on the ground must be covered by two photographs in order that the interpreter can view it under a stereoscope to give it depth or third dimension. If stereo cover is not provided, photographs have little value other than for use as a map supplement.

A communications strip is a series of photographs providing stereo cover of all or a portion of some railroad, highway, or other line of communication.

A mosaic is a sheet made up by fitting together a number of photographs of an area so as to make a picture of an area larger than could be taken by one exposure of the camera. It is an uncontrolled mosaic if the individual

photographs have just been fitted together by eye and no elaborate effort has been expended in fitting them to a system of horizontal control obtained from ground survey data or accurate maps. If they have been fitted to a system of horizontal control, the mosaic becomes a controlled mosaic and is suitable for artillery firing and space measurements. It is important to remember that a map may be produced faster and less expensively than a good controlled mosaic and consequently controlled mosaics are seldom used.

Uncontrolled mosaics are normally made up and produced at higher echelon installations, but in cases of urgent demand the interpreter with army, corps, or division headquarters may take photographs from his basic or current cover and make one or two rough mosaics for immediate use. One of the most serious and frequent mistakes made in the use of mosaics is that of taking measurements of direction and distance from any mosaic picked up in the field. Such measurements can only be made accurately from controlled mosaics and these are seldom found in the field.

The panoramic oblique strip is a series of photographs taken from an elevation between 200 and 2,000 feet by a camera shooting at an angle of approximately thirty degrees or less out of the side of the aircraft. It is used as a supplement to maps, vertical photographs, and visual reconnaissance. Experience has shown that many men can visualize terrain more easily from the low oblique than from the vertical photograph. For amphibious operations, oblique strips should be distributed to lower echelons to include the leaders of the assault platoons for identification of landing areas.

Subsequent to H-hour the above photographic material is extended to the enemy rear as our forces advance. New or repetitive cover of any area is furnished as required to provide additional information on new defenses, positions, installations, and activity. In addition, an increasing amount of photography is being taken of enemy activity on roads and in ports at night with flash bombs and flash equipment. Our enemies are now so harassed from the air by day that they are forced to move only at night. As technical difficulties are overcome, night photography will greatly increase the information available to the armies concerning enemy troop and supply movements. In the past, lack of this information has been one of the weakest links in the chain of available intelligence.

In the event an unexpected breakthrough occurs, the rate of advancement may be so rapid that photographic reconnaissance facilities can furnish little more than strips of the communications lines to be covered. This, however, is the information of most value to the advancing force during a fast breakthrough.

The photographic material discussed above is put to many uses by each branch of the ground forces. It serves tactical operations as a supplement to maps, and, when in the hands of a photo interpreter, as the chief source of intelligence concerning enemy defenses, installations, and activities.

Photographic information is important as a map supplement for it furnishes the current and detailed information essential for proper execution of tactical missions. With its aid, unit commanders and staff officers can make more intelligent selection of concealed and defiladed assembly and bivouac areas, routes of approach, and motor parks. Lines of departure are more easily determined and are more surely located by lower echelons if pointed out on a photograph. This true and up-to-date picture of terrain is also highly valuable to paratroop and airborne operations. It not only permits a more intelligent selection of dropping and landing grounds, but aids in briefing troops and air crews so that the operations may be carried out as planned.

The value of the aerial photograph as a map supplement in briefing for any mission cannot be overemphasized. Detail is highly valuable to a patrol, for the cover or concealment offered by the smallest gully or bush may often mean the difference between success or failure. When used for planning the route a patrol is to take, the aerial photograph shows many trails, fences, and ob-

stacles of use to the patrol. It also aids in keeping oriented and finding directions in unfamiliar territory at night. In addition to briefing, aerial photography serves a purpose in the interrogation phase. When the patrol returns, the intelligence officer will get a much more accurate idea of the location of activity and information found by the patrol if he can place a picture rather than a map in front of the men and allow them to point out locations on it. Success has also been achieved in using photographs when interrogating prisoners, refugees, and deserters who can find locations on a photograph but are at a loss when asked to use a map.

Armored and antitank units make use of photographs both in planning their routes and operations and in determining the areas in which enemy armor is operating. Many ditches, stone fences, and man-made obstacles are evident from the photograph which do not appear on a map.

Although important as a map supplement, photographic material is even more important when placed in the hands of the skilled photo interpreter. All interpreters check information received from other sources and act as advisers to commanders and their staffs on photographic matters. Their major function, however, is to derive information from aerial photographs.

Interpreters with the army headquarters in the field find targets for air support and heavy artillery, and annotate and distribute photographs to be used by the air force and artillery as target charts. The air force uses these to locate the target. Artillery air observers use them as an aid in directing fire. This function of producing target information became so important with the Fifth Army in Italy that a special Target Section was set up in the G-2's office. These targets not only include enemy gun positions for counterbattery operations, but also targets such as supply dumps, bridges, tunnels, command posts, bivouac areas, motor parks, and others.

Interpreters at corps headquarters, on the other hand, spend some time on enemy defenses and on roads, trails, and condition of communication facilities for the corps engineer, but their main job is locating enemy gun positions for counterbattery operations. Fifth Army has made a practice of having an interpreter and assistant counterbattery officer from each corps located with the laboratory facilities near the air field from which photographic reconnaissance missions are flown so that this counterbattery information may be obtained and sent by telephone or radio to the corps artillery with the least possible delay. These men know where the enemy's artillery positions are, which of them are occupied each day, and just where and when new ones appear. Such information is also valuable to the G-2 as an indication of the enemy's probable scheme of maneuver, particularly if he is on the defensive or planning to retreat and fight a delaying action.

Interpreters with the division headquarters, however, have one of the most difficult, most interesting, and most important jobs of all. They must advise the commanding officers and intelligence officers of all the units in the division as well as the commanding general and his staff. In practice, it has worked out that an interpreter with initiative is their instructor in the art of reading of photographs as well as their adviser on photographic matters.

A division interpreter must extract many kinds of intelligence from photographs. He locates enemy defenses to the immediate front of the division—such defenses as trenches, mortar positions, machine-gun positions, wire, and, in terrains such as the desert, even mines. This information is of great value to the infantry.

For the artillery he supplies information concerning enemy installations, command posts, troop concentrations, and other targets. On the Anzio beachhead, interpreters were so successful in locating forward artillery positions that the enemy was forced to emplace his artillery much farther to the rear than he had initially planned.

For the engineers he supplies up-to-date

information on the status of roads and bridges so they can plan their activity. When bridges are out or will likely be destroyed by the retreating enemy, the interpreter advises the engineers as to where the stream may be forded or where the most likely spot for a bridge may be.

In short, the entire division has need of information which can be furnished only by the photo interpreter or can be furnished most efficiently by him.

The preceding description shows the extent to which the strategic and tactical uses of aerial photography by the ground forces have been developed. It is largely this development that has enabled the Intelligence Sections to keep abreast of the enemy situation in fast-moving modern warfare.

Completed Staff Work

An extract from an article by Colonel William T. Clement in *Marine Corps Gazette.*

"COMPLETED staff work" simply means that the staff officer studies the problem assigned to him, arrives at a solution, and presents that solution in such form that all that remains for the commander is to sign or reject. "Completed action" should be continually stressed for it has often been observed that the more difficult a staff problem is, the more pronounced is the tendency to present the solution in a piecemeal manner, rather than as a complete solution which would furnish the commander with answers.

The impulse to ask the commanding officer or the executive officer what to do, accompanied by hints for suggestions as to how it should be done, must be continually suppressed by a staff officer. If the commander and the executive officer must make routine decisions and prepare the solution to staff assignments, then the staff officer is not properly performing his duty, for he could well be replaced by a clerk who would only have to write down the solution prepared by the commander or the executive officer. The staff officer should never forget that his paramount duty is to furnish the commander with answers.

The theory of "completed staff work" does not preclude a rough draft of the proposed plan or order. Yet this rough draft must not be a partial solution, presented for the purpose of "sounding out" the commanding officer or the executive officer. Instead, it should possess the content and be in the form in which the staff officer proposes ultimately to issue it. The only difference between the rough draft presented for approval and the final document envisaged by the staff officer is that the rough draft need not be perfectly neat, nor possess the necessary copies. Under no circumstances should the rough draft be used as a means of shifting to the executive officer or the commander the burden of formulating the solution.

The doctrine of "completed staff work" may result in more work for the staff officer, but it likewise results in more freedom for the commander and his executive officer. As an instrument of achieving command freedom, "completed staff work" must be a concept steadfastly adhered to by all staff officers.

There is but one criterion by which a staff officer can measure the completeness of his work. Before submitting any directive, plan, or order, the staff officer who prepared such a document should ask himself, "If I were the commanding officer would I sign this document in its present form?" If the answer is affirmative, then the document evidences the fact that the staff officer has applied the doctrine of "completed staff work." In so doing he has assisted the commander in exercising the functions of command. He has facilitated the accomplishment of the mission of the troops. Because of this, he has justified the existence of his staff section and has proven himself a capable staff officer.

Signal Problems in Joint and Combined Operations

BRIGADIER GENERAL FRANK C. MEADE
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IN most respects the basic framework of a signal communication plan is the same today as it was ten or twenty years ago. Because of this condition, it is sometimes difficult to visualize signal problems involved in joint and combined operations. However, when one examines War Department signal planning which is primarily logistical, and theater signal planning which is primarily operational, some of the difficulties become apparent.

It is the responsibility of the Office of the Chief Signal Officer, Army Service Forces, to study the operational signal requirements of each theater. From these studies conclusions are reached on the overall Army signal communication requirements of each theater, on the organization and training of required signal units, and on a schedule to insure that both equipment and units are provided to each theater in time for the accomplishment of its operational mission.

Since these specific plans must be made months in advance of a contemplated operation in a theater they are not held to be inflexible but are subject to such amendment as is dictated by changing military conditions.

Two main factors determine the ultimate requirements in signal equipment and units: the extent of territory to be covered and the number of installations and headquarters.

Experience in World War II indicates that the first factor is not difficult to gauge, since the possible areas of operation are limited. To date War Department estimates have been strikingly accurate.

The second factor, however, is extremely involved. While the determination of the signal requirements for the installations and headquarters of an army is a matter calling for correct tabulation only, the determination of requirements for a group of armies, for the communication zone and for a theater headquarters is a complex problem. Joint and combined operations often develop an involved command structure not covered in our field manuals. This structure in turn organizes additional headquarters which require signal communication facilities.

The Chief Signal Officer's planning is designed to cover specific requirements of the U. S. Ground and Service Forces only. However, requirements for fixed wire communication, toll center to toll center, must include the needs of Army Air Forces, Navy, and Allied Forces, since the fixed wire communication system must be designed, installed, and operated under one commander—and the only possible commander is the signal officer of the theater. Of course he can, and probably will, delegate his authority to one of his assistants, but he cannot delegate his responsibility.

Whereas War Department signal communication planning is designed to anticipate and provide for the theaters' future special requirements, theater signal communication planning is designed to utilize the means already available or definitely en route to support the projected operation. Therefore, a theater signal communication plan is primarily, and almost exclusively, operational. It is a short-time plan to support a specific operation but behind the plan is a vast amount of detail and ground work.

The plan must be based on a complete knowledge of the tactical and strategic mission of the force involved in the operation, the contemplated rate of advance, and the ultimate objectives. Before an intelligent approach to the theater signal communication plan can be made, certain information of enemy signal communications must be obtained and evaluated. Obviously such information must be obtained through intelligence channels.

In any offensive operation, especially combined air-amphibious, the signal communication system can carry the initial load only if used with the utmost economy. Since signal communication is a command responsibility —this command responsibility is stressed in

all existing War Department doctrines—the theater signal officer can and must obtain a command decision on the following points:

The allotment of available fixed plant;

The priority in providing fixed wire circuits including requirements of the Navy and port requirements;

The non-military facilities which we will be called upon to supply; and

The organization of the areas of Allied responsibility, if a combined operation.

While preparation of the signal communication plan is a major duty for the theater signal officer, there are other functions for which he has a continuing responsibility. These functions include:

1. The continuous review of theater requirements for signal equipment and personnel balanced against the supply scheduled by the War Department.

2. The preparation of comprehensive standing operating procedures which are subject to continuous rather than periodic revision.

3. The continuous check of the replacement system to insure that communication replacements, whether for Signal Corps or for other arms, are received in the correct proportions, have been trained for the functions they are to discharge, and are assigned to proper duties.

4. The constant liaison and coordination with signal or communications officers of the Navy, Allied Forces, and local civil authorities on overall communication problems.

We are all thoroughly cognizant of the manpower situation facing the country at the present time. Theater commanders have been given a Troop Basis for their theater and they are expected to operate within this allotment. Consequently the theater signal officer in his dual capacity as staff officer in charge of general communications policies and operations and commander of the fixed wire signal communication system for the theater must operate within his allotment. To do so he must be alert and unswerving in order to insure the elimination of services used merely for convenience, and to press for the consolidation and closing of rear establishments as the action progresses forward. In his capacity as special staff officer, he must again secure the full backing of the commander on these matters.

During the past year numerous operational reports have been submitted covering signal communications. The most impressive feature of these reports is the "rediscovery" of basic signal communication operating principles by commanders, who for the first time have had to rely completely upon military facilities for their signal communications.

A few of the rediscoveries include the following:

1. In amphibious operations allocation of shipping to GHQ troops, especially signal communication troops, must be reserved before the subordinate agencies are given their allocations.

2. Each unit must rely on its own internal communications. If it imposes upon another unit for trunk line facilities it must give sufficient advance notice so that these additional facilities will be available.

3. The electrical transmission of long administrative messages, especially during the initial phases of an operation, is unwarranted.

4. The more successful the tactical operation, the greater will be the demand upon communication personnel. So if all communication personnel are committed to the planned program, a commander will not be prepared to supply the additional signal requirements which unexpected success imposes upon him.

5. The over-classification of messages reduces the classification of everything.

Again the theater signal officer can and must secure firm, intelligent, and continuous command backing to correct these defects.

The theater signal officer is further confronted with the problem of furnishing signal communications to certain non-military agencies, such as the press, Red Cross, OSS, OWI, Diplomatic Service, and shipping agencies. The needs of these agencies will include

signal communications for radio broadcasts, personal cable service, transmission of photographs by facsimile, and many others.

Some of these problems have been introduced because the remarkable development in signal communication equipment has resulted in increasing demands for radio relay equipment, high-speed printer circuits, and other services which were regarded as pure luxury before the war. Proof of this startling development is borne out by the fact that there are in use now only six types of radio sets which were standardized, issued, and used by the United States Army in 1939. Today the Signal Corps procures over 100 types of radio communication sets for the U. S. Army. As a result of such progress there is now a complex signal communication system operating in theaters all over the world which includes many services far beyond our prewar conception. A few of these include:

1. Radio stations with power up to 40 kilowatts.

2. Teletype networks which can be switched as readily as telephone calls.

3. High-speed tape transmissions whereby operation at a relay point merely consists of pulling a piece of paper from a receiver and inserting it into an adjacent transmitter.

4. Carrier telephone systems down to and sometimes in advance of corps headquarters.

5. Radio relay systems to bridge wire gaps across streams and rivers.

Because of these additional services a commander can now impose his command more effectively and sooner than he has ever been able to do in the past. However, as with all services, there is a price to be paid. This price is the use of complex equipment which requires large quantities of highly skilled and hard-to-train personnel for its maintenance and operation. The decision as to whether these services are justified must be made by the commander.

Amphibious Blockbusters

From a British source.

THE RAF Bomber Command is now using the 12,000-pound blockbusters to create artificial tidal waves that destroy Nazi shipping. These mighty bombs, capable of making craters on land 110 feet across, have a devastating effect when dropped in docks and tidal basins.

A Lancaster crew, taking part in Bomber Command's first great four-engine daylight raid on the E-boat pens of Le Havre in June, noticed that the greatest havoc seemed to be caused when the bombs missed the pens and fell in the water. They saw E-boats at their moorings lifted clean out of the water. Other blockbusters which fell at the entrance of the concrete pens set up such colossal waves that experts consider they must have severely undermined the massive structure.

So when the Lancasters and Halifaxes next went out in daylight, some of the bomb-aimers concentrated on the water and not on the land. This second raid was on the Nazi E-boat base at Boulogne, and proved conclusively how amphibious the blockbuster is.

There were nine E-boats visible in the port. Thirteen-hundred long tons of bombs were dropped within a few minutes. When the smoke and dust had died away all the E-boats had vanished. "When all the factors are taken into account," says the official report, "it may be confidently asserted that they did not leave the harbor but were sunk."

Reconnaissance photos show that the only shipping to remain intact in the port after this "tidal-wave raid" were a tank landing craft on the slips and six small auxiliaries. Five wrecked or partially submerged ships 150 to 200 feet long were photographed, and eight others of 100 to 150 feet.

Experts estimate that, if the blockbusters were capable of such havoc in the open water of the port, the effect of the waves in the confined space of the pens may have been even more devastating.

Cracking a Fortified Position

LIEUTENANT COLONEL CLIFFORD L. HARRISON, *Field Artillery*
Instructor, Command and General Staff School

WHEN it becomes necessary to assault a fortified position frontally, it probably means that an envelopment over unfortified ground is impossible and that the fortifications cannot be bypassed. Bands of heavily fortified areas some fifteen or more miles apart would contain concrete forts as shown in Figure 1, dragon's teeth, concertina and other wire entanglements, personnel and antitank mines; all covered by interlacing fire from machine guns and all types of artillery.

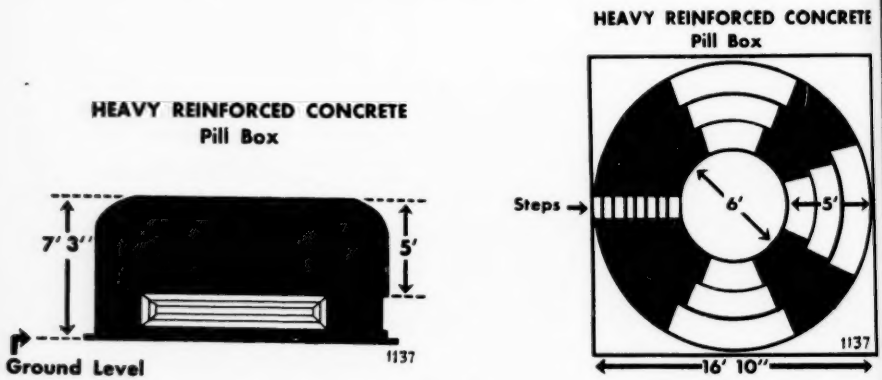

FIGURE 1.

To assault such a position without the combined arms and overwhelming numerical superiority, particularly in artillery, aviation, and tanks, seems foolhardy.

In considering how much artillery support is necessary to support such an operation, let us consider that our (fictitious) LX American Corps is in contact with opposing forces along a fortified zone with divisions abreast. The penetration to this point was accomplished after a first such fortified zone fifteen miles northwest had been ruptured. For the proposed continuation of the attack in two weeks, the corps commander decided to relieve the 2d Infantry Division in the line with the 10th and 12th Infantry Divisions, and Figure 2 shows the situation as it will appear on D-day.

The primary problem confronting artillery officers in all echelons, from army right down to our 10th Infantry Division, concerned recommendations for the employment of artillery in such a manner that, by the coordinated effort of all the means placed at the disposal of our division, the breakthrough of this heavily fortified position would positively be effected. Once that breakthrough has been made, our artillery must be so organized for combat and so disposed as to be able to deliver continuing fires. To keep the attack rolling, once under way, is of course the problem and No. 1 mission of all assault and supporting units. It must be kept in mind that *every arm and service* has its part to play, and the teamwork and the coordination of all the components will determine the success of the operation. That success will result if the prior planning is complete, detailed, and coordinated. General staff officers are responsible for that planning, for in no other way can the commander's decision be carried out effectively.

As soon as the division commander's deci-

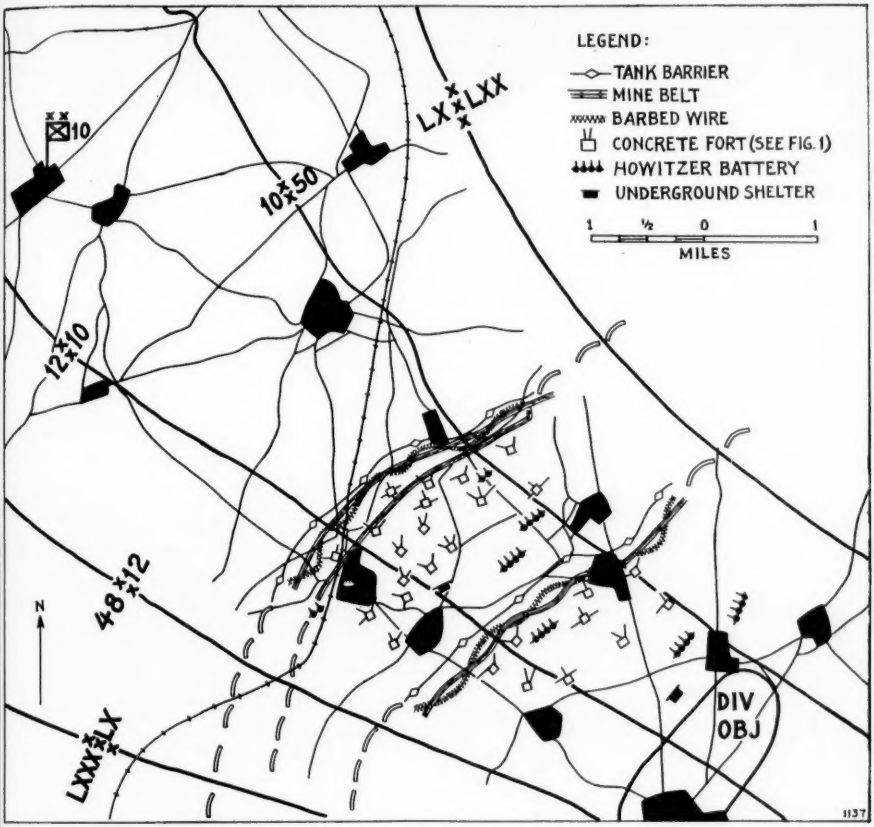

FIGURE 2.
LX CORPS—SITUATION ON D-DAY.

sion has been announced, the division artillery officer will begin planning for the artillery support. In this planning stage he must know:

1. The division mission.
2. Corps and army scheme of maneuver, so that the division artillery fire plan may be prepared and coordinated.
3. The division plan of attack, so that the artillery can organize for combat, and can determine position locations so as to support the attack.
4. Artillery attachments from corps.
5. Length of preparation preceding the attack.

Most of this information is already known, for our attack jumps off regiments abreast at 0700 D-day, preceded by a four-hour artillery preparation in two-hour phases. Certain reinforcing artillery has been requested from corps.

With that information, the division artillery officer can start his S-3 section working on the planning phase to cover the following matters:

1. The ammunition supply.
2. Selection of battalion areas.
3. Field artillery organization for combat.
4. Communications (signal).
5. Coordination with corps as to the prearranged fires for the preparation.
6. Complete survey.
7. Liaison between artillery and support units.
8. The corps plan of fire support.

So it can well be seen that in order to accomplish all these plans prior to the attack, the artillery must be kept informed of the plans of higher echelons as they are being developed. If the corps waits until their plans are complete and approved before telling divisions about them, the artillery will be able to provide little more than disorganized support. Therefore, planning will be concurrent in all echelons. All division staff officers must remember to "tie in" with the artillery, engineers, military police, and other arms and services so that they will know what is going on, and thereby assist in two ways: (1) by giving technical advice concerning their branch, and (2) by beginning their detailed planning which will assure that they are ready to support the action when H-hour arrives.

The organic division field artillery is the minimum amount considered necessary to support the division under favorable conditions. When a heavy task comes along, this organic artillery must be reinforced. The same is true of corps in substance—they should be provided with whatever artillery they need to accomplish their job, and this artillery will be allotted them by army.

Our LX Corps artillery officer computed the amount necessary for his corps and divisions within his corps to do the job. He accomplished this after making reference to the table in FM 6-100 (Figure 3) showing the number of artillery batteries needed in an assault on an *organized* position per 1,000 yards of front. As the frontage in our problem is 2,000 yards wide, our figures should be double those shown. It is believed the artillery commander will undoubtedly request the maximum amount in his request for reinforcement, because our attack assaults a fortified position dug in with concrete poured over a five-year

Requirement	*Batteries per 1,000 yards of front*			
	Light	*Medium or Heavy*	*Total*	*RR or long-range artillery*
Maximum	18	18	36	1.5
Normal	14	13	27	1
Minimum	10	10	20	

FIGURE 3.

period, rather than being merely an organized position. The allotment to our division was arrived at as follows:

a. Corps artillery officer figured need of corps and divisions.

b. Corps commander approved the recommendation and forwarded to army.

c. Army consolidated requests from corps and sent to theater commander.

d. Theater commander made allotment based on amount available, and notified army who reallotted to corps.

e. Corps held some artillery and allotted remainder to divisions.

In this situation, the 10th Infantry Division will have (counting its organic and attached artillery) nine battalions of 105-mm howitzers, five battalions of 155-mm howitzers, and two battalions of 155-mm self-propelled guns (M-12's). The field artillery groups are attached to our division and three of the four artillery battalions from the 2d Infantry Division are attached when the 10th Infantry Division takes over that portion of their sector wherein three of the 2d Infantry Division artillery battalions are located (Figure 4). This gives us the fire from 264 artillery pieces

on a 2,000-yard front, or a density of 1/7½ yards (one gun to every seven and a half yards). These figures may be compared with the following:

	Battalions		
	L	*M*	*Hv*
10th Div Arty	3	1	
2d Div Arty	2	1	
901st FA Gp	4		
902d FA Gp		3	
903d FA Gp			2
Corps Arty fires in our sector		3	3
TOTALS	9	8	5

FIGURE 4.

1. El Alamein:
   a. 800 guns, front of 14,000 yards, density of 1/17 yards.
   b. The division which spearheaded the El Alamein attack had support of 360 of the aforementioned 800 guns on front of 1,000 yards, or density of 1/3 yards.
2. In final Tunisian battle, an Allied division on 1,000-yard front had 500 guns in support, giving 1/2 yard density.
3. A Russian penetration of a Nazi fortified position had two batteries per 100 yards, or density of 1/13 yards.

Obviously, the artillery must be kept under division control in order to keep the control centralized. Both during the preparation and during the attack it is necessary that the commander be able to mass his artillery fires quickly on critical areas, to shift quickly from one area to another should the attack bog down or should the enemy counterattack. This necessitates that the division artillery be so organized for combat as to give flexibility of control and efficient fire support. All units that need close support should have that support and should be able to secure it quickly. Control of the artillery should be centralized in order to provide the commander with a powerful means of influencing the action.

Units within a group should have similar missions, and a group commander should not have too many battalions to command.

The latest issue of FM 6-20, Tactical Employment of Field Artillery, dated February 1944, reads as follows:

"To simplify control, various artillery units may be grouped. The artillery commander's order specifies the commander and headquarters of the group, the units that are to compose it, and its mission. The purpose of forming a group is to coordinate fire, observation, and liaison; the guiding principle in forming a group is that all artillery units in it have a common mission, regardless of caliber or other characteristics. The group commander has tactical control of the unit, and is responsible for ammunition supply. If a group is formed to furnish direct support to a given unit, the commander of the organic battalion normally charged with direct support of that unit should command the group."

If a group consists of more than two battalions, it should have a group headquarters and headquarters battery, such as "902d Group." If the group consists of only two battalions, it can be controlled satisfactorily without a group headquarters. In this case, it takes any name or number the commander chooses to give it: "A," "B," and "C" groups, Red, White, and Blue groups, etc. Common practice is to give it the number of the commanding battalion. The schematic diagram, Figure 5, shows a solution for the field artillery organization for combat in this problem.

As to missions for the various groups shown:

For Groups 37, 38, and 39—direct support of their respective infantry regiments.

General support brigade—general support, firing prearranged missions against obstacles and fortifications so that maximum fire power is employed, and reinforce fires of direct support groups.

903d Group—silent prior to 0500. Beginning 0500, direct laying destruction fires on fortification apertures.

Two gun batteries attached to each infantry regiment 0700.

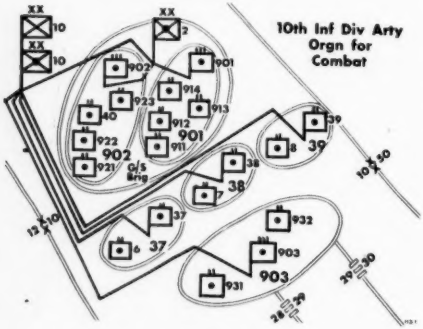

FIGURE 5.

For the general plan of artillery support:

Artillery in position (2d Infantry Division) prior relief, continue routine fires.

All other artillery silent till preparation.

Attack preceded by two-phase artillery preparation, beginning 0300 D-day.

First Phase: *two hours.*—All artillery, less 903d Group and battalions required to assist corps artillery counterbattery, neutralize command and communications system in battle position and hostile regimental reserve area.

Second Phase: *two hours.*—Direct support groups neutralize forward portion hostile position. General support brigade, less medium battalions required to assist corps counterbattery, continue neutralization command and communications system and hostile reserve area. Corps heavy howitzer battalions will execute destruction fires on obstacles and fortifications on division front. 903d Group, destruction fires on dragon's teeth and fortifications.

Basic Principles of Plan.—Each infantry regiment, with only one battalion in the assault initially, is continuously supported by a group of two artillery battalions in direct support.

This basic support can be progressively augmented by:

a. One to four battalions, 105-mm howitzers (901st Group).

b. One to four battalions, 155-mm howitzers (902d Group Reinforced). In addition, each infantry regimental zone of action can be supported by eight 155-mm guns employing direct-laying methods (903d Field Artillery Group). Eight such guns are attached to each infantry assault regiment effective 0700.

The general support brigade will be assigned prearranged missions for the attack of the defenses and will establish observation for fires on targets of opportunity, pending calls for reinforcement from the direct support groups. General support brigade will send liaison parties to Groups 37, 38, and 39.

The general support brigade will also assist corps on counterbattery fires, and deepen and thicken fires of direct support groups.

In this solution, it is premised that corps is handling all counterbattery fires during the progress of the attack (except transient targets) and that corps and army are executing long-range and flanking fires.

And now a few words about the coordination *laterally*. This is accomplished by designating *normal zones* generally coinciding with the zones of action of the supported unit, *contingent zones* lying outside that normal zone. Within the 10th Division zone, this lateral coordination is effected by the division artillery officer, while outside our division zone the coordination is accomplished by conference between the division artillery officers concerned under the supervision of the corps artillery officer, or by the corps artillery officer himself.

The corps commander can materially assist the main effort by massing the fires of all artillery within the corps on a very narrow front. By causing the 10th and 50th Infantry Division field artillery fires to fall on the front of the 10th Infantry Division, the fires of the 12th and 48th Infantry Division field artillery

to fall on the front of the 12th Infantry Division, and by distributing the corps artillery along this 2,000-yard front, it will provide considerable fire power on a comparatively narrow front.

For counterintelligence purposes, these fires are limited to those units which have been in position. They will maintain a normal amount of fire. As for the battalions moving into position during the two nights preceding D-day, they will have completed an extensive survey, tying in the gun positions to the target area, and by securing the fire data provided by the 6th, 7th, and 8th Field Artillery Battalions (of 2d Infantry Division) and applying last minute weather corrections, they will be able to execute their prearranged fires accurately when called for. A personal reconnaissance by each battalion and battery commander would be necessary in this situation in order to complete the survey, store and camouflage the ammunition, select and camouflage the gun positions, and complete the necessary communications net.

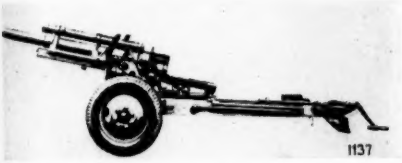

FIGURE 6.
105-MM HOWITZER, M2A1, AND CARRIAGE, M2.

That brings us to the preparational phase of four hours which precedes the attack. If the artillery preparation is effective, then the attack has a real chance to succeed. The following weapons are used in this problem:

First, we have the 105-mm howitzer, M2A1 (Figure 6). This is the weapon of the organic light battalions of the 10th Division Artillery, the attached 6th and 7th Field Artillery Battalions of the 2d Infantry Division, and the four battalions of the 901st Field Artillery Group. Altogether the 10th Infantry Division has nine battalions of 105-mm howitzers, organic and attached (a total of 108 105-mm howitzers). This weapon is mobile, has a relatively high rate of fire, and can be fired by direct-laying.

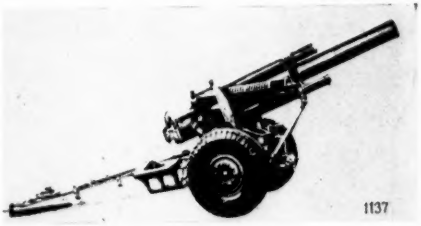

FIGURE 7.
155-MM HOWITZER, M1.

Next, we have the 155-mm howitzer, M1 (Figure 7). This is the weapon of the 40th Field Artillery Battalion of the 10th Division, the attached 8th Field Artillery Battalion of the 2d Division, and the three battalions of the 902d Field Artillery Group. In this situation, the 10th Infantry Division has five 155-mm howitzer battalions organic and attached (a total of sixty 155-mm howitzers).

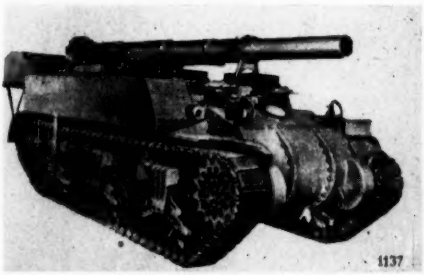

FIGURE 8.
155-MM CARRIAGE, MOTOR, GUN, M12.

Third, we have the 155-mm self-propelled gun, M12 (Figure 8). The 903d Field Artillery Group, which is attached to the 10th Infantry Division in this situation, has two battalions equipped with this gun (a total of twenty-four 155-mm self-propelled guns). This weapon is well suited to the destruction of emplacements by direct fire. The gun is mobile and fires a heavy projectile with a

reasonably high muzzle velocity. One round from this gun is sufficient to pierce a bunker

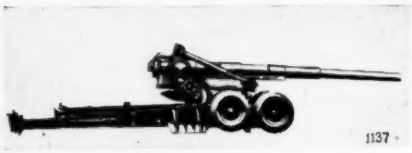

FIGURE 9.
155-MM GUN, M1.

with five-foot concrete walls and to damage the interior considerably.

FIGURE 10.
240-MM HOWITZER, M1, IN FIRING POSITION.

These first three weapons are those available to the 10th Infantry Division (in its organic and attached units) for the attack. To complete the picture, let us briefly look at the weapons that the corps and army artillery units will use in supporting the attack.

Figure 9 shows the 155-mm gun, M1. Firing high-explosive shell with delay fuze, this gun will blow a crater about two feet deep in heavy concrete. Armor-piercing or armor-piercing cap shells will penetrate from five to six feet of concrete. Corps has two such battalions, with a total of twenty-four guns.

In Figure 10 is shown the 240-mm howitzer, M1. Corps has four such battalions, with a total of twenty-four such howitzers.

Figure 11 shows the 8-inch howitzer, M1, of which corps holds two battalions; a total of twelve howitzers. These heavy-caliber

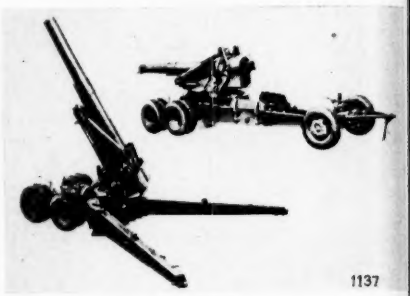

FIGURE 11.
8-INCH HOWITZER, M1.

weapons are effective against steel and concrete, and in some cases may be required, but their vulnerability and lack of mobility make them unsuitable for close-range work.

Figure 12 shows the maximum effective range and comparative burst effect of a single round for each of seven types of artillery weapons. The chart is not accurate as to scale, but does give a comparison of the capabilities of each weapon that may give a better understanding of their employment. To illustrate further, a round from the 105

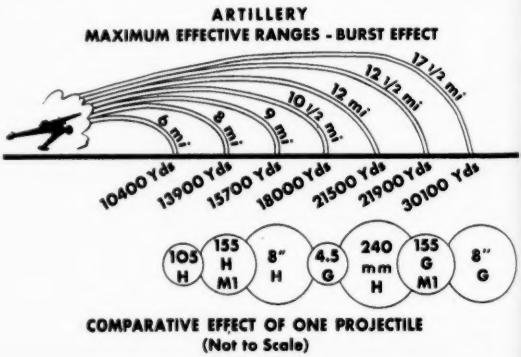

FIGURE 12.

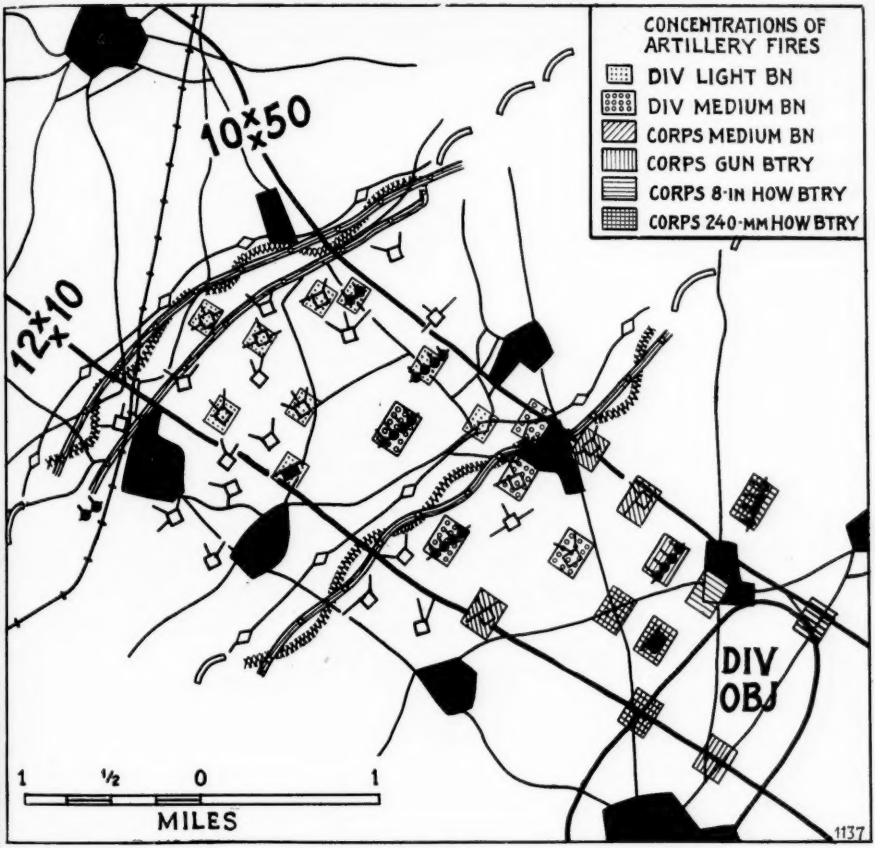

FIGURE 13.

ARTILLERY PREPARATION—FIRST PHASE. DURING BOTH PHASES OF ARTILLERY PREPARATION, CONCENTRATIONS SHIFT FROM POSITIONS INDICATED TO OTHER KNOWN TARGETS NEAR BY, TO ENSURE THAT ALL RECEIVE THEIR FAIR SHARE OF FIRE.

mm howitzer will dig a hole in compact soil fifty feet wide by fifteen feet in length and five feet deep; while the 240-mm howitzer furrows out a hole one hundred by thirty feet and fourteen feet deep.

Preparation.—A four-hour preparation in two-hour phases will be fired in order to neutralize as many enemy weapons as possible, to disrupt the hostile command and communications nets, to destroy observation posts and command posts, and to isolate the battlefield.

If our enemy information is accurate enough, and we can crack down hard enough in the first phase, we stand to accomplish much of the following: neutralize all located hostile artillery by counterbattery fires; smash some hostile observation posts and command posts; neutralize fires from heavy infantry weapons; destroy message centers and other signal communications; and other

destruction fires. The great German artillery commander during the last war, Colonel George Bruchmüller, insisted on a preponderance of three to one for artillery employed on counterbattery fire alone. This is what we strive for in our army, for experience proves that initially it takes a battalion to neutralize the fire of an enemy battery. Rarely, however, can we accurately locate in excess of fifty percent of enemy artillery.

In the second phase we will continue the neutralization on hostile artillery, and concentrate on centers of resistance and command and communications nets.

The artillery fires placed during this preparational phase are planned and prepared during joint discussion by division G-3 and artillery S-3. They decide how many fires can be delivered and where they shall be placed. These recommendations are, of course, approved by the general officers involved. The decision as to where fire shall be placed results after a careful study of the plan of attack, terrain, enemy strongpoints, road net and road centers, fortifications, dragon's teeth, casemates, and other information concerning enemy dispositions which G-2 has been able to assemble. The maximum number of battalion concentrations which our division artillery can deliver at any one time are determined by the number of artillery battalions in the division (organic and attached) plus the number of corps and army battalion concentrations to be placed in our division zone, less the number of battalion counterbattery missions we shall have to deliver for corps. By coordination with corps artillery headquarters on the preparation, we will insure that important targets are not left unfired on, nor will relatively unimportant targets receive more than their fair share of fire.

Figures 13 and 14 give a picture of how the artillery fires of our division and the supporting LX Corps might look were someone trying to plot it as it falls. These fires are all prearranged as to time and location, so let us suppose it is now shortly after 0300 on D-day. Each concentration is shown to scale. All concentrations are fired by battalion except those of heavy artillery which are by battery. The area for light artillery battalions is 150 by 200 yards, for all others 250 by 400 yards.

So, remembering the corps prescription, what targets shall we have the division artillery fire on during the *first phase?* On the command and communications systems in the battle positions, on known battery positions, and on centers of resistance within our division zone. During the first phase, corps artillery may execute counterbattery exclusively, using our division medium artillery group to assist. Should army artillery be present, they will engage in long-range counterbattery and interdiction of road centers, else this mission falls to corps artillery.

The fires, if plotted, might look something like those shown in Figure 13. Considering the few minutes necessary to fire a battalion concentration, plus a minute or two to shift fires to the next target, we arrive at an average of about twelve concentrations for the light artillery battalions and eight to ten for the mediums and heavies per hour. Fatigue on the part of the gunners will reduce this rate if fire is continuous for a great number of hours.

During the second phase, all echelons continue neutralization begun during the first phase. Corps will use our medium battalion group to execute counterbattery during this phase, in exchange for which they will execute destruction fires on obstacles and fortifications with probably one-half of their two 155-mm gun battalions, their four 240-mm howitzer battalions, and their two 8-inch howitzer battalions on the front of our division. Our 155-mm self-propelled gun battalions, silent till 0500, now go into action and, using direct-laying methods and taking advantage of whatever defilade is available, slip up forward and pile in round after round of armor-piercing shell on the apertures of the forts and the dragon's-teeth obstacles. They will have to take their losses of course, but possibly if

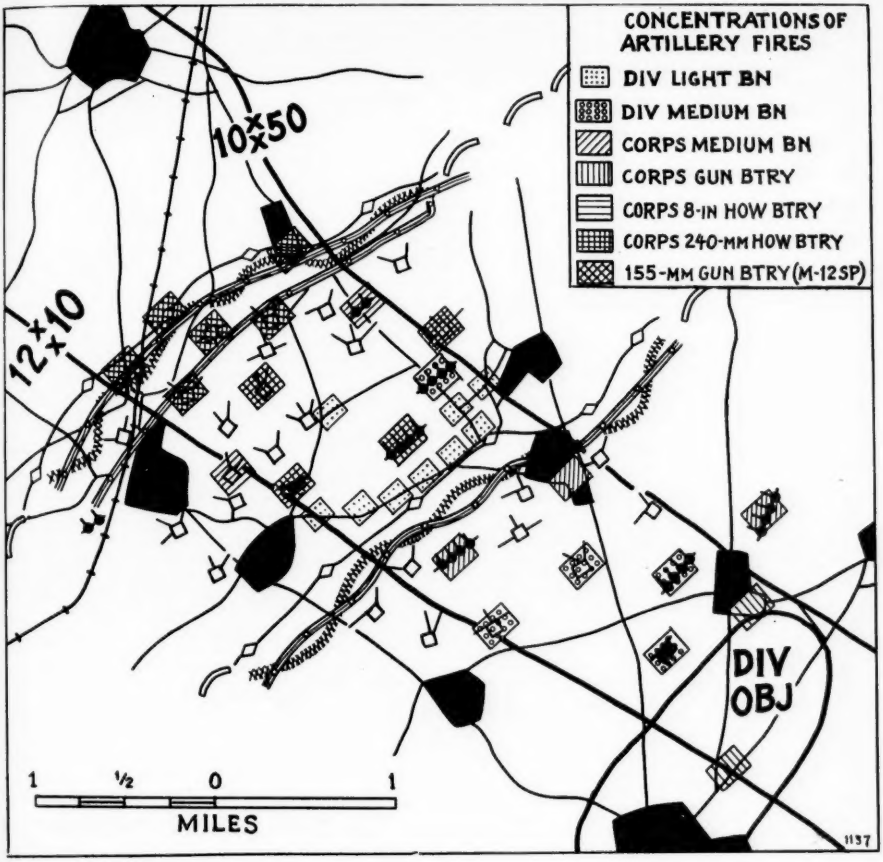

FIGURE 14.
ARTILLERY PREPARATION—SECOND PHASE.

they change position frequently before they can be registered on, they can get along pretty well.

Figure 14 shows what this second phase fire will look like.

One important point on counterbattery fire, which is an important mission in all echelons: By using fifteen percent white phosphorus mixed in with the high explosive, counterbattery fires can be made more effective because of the incendiary qualities of the white phosphorus and its harassing effect on personnel. The corps maintains a counterbattery chart on which is indicated the accurate location of enemy batteries, with an officer assigned the duty of seeing that sufficient friendly fire is delivered on located hostile batteries to keep them neutralized.

The following obvious conclusions concern types of projectile and weapons in assaults on fortifications:

1. **Armor-piercing high-explosive shell with**

point detonating fuze is necessary to reduce heavy concrete fortifications partially covered with earth.

2. Firing at concrete pillboxes by all weapons at ranges beyond 10,000 yards will, due to dispersion, produce so few hits as to make the expenditure of ammunition a useless waste.

3. Direct fire methods should be used against concrete fortifications whenever possible. This includes ranges up to 3,000 yards, and sometimes beyond.

4. The 105-mm howitzer is not a suitable weapon for reducing heavy concrete fortification.

5. Corps and GHQ artillery should execute destruction fires on all located enemy pillboxes in the path of the main effort.

Booby-Trap Experts

From *Battle of the Ridges*, a brochure produced by personnel of the Australian Army Directorate of Public Relations and published by the Department of Information, Australia, 1944.

SERGEANT Allan Naismith was the booby-trap expert of the Brigade. Sergeant Naismith's central theme was the hand grenade, a fistful of death at any time, but a veritable "blitzkreig" after he had doctored it. He made delicate little gadgets to put under things the Japanese might lift or touch—gadgets designed to kill.

The tricky part about such booby traps is setting them, so Naismith decided to build them and set them, too. In these shows he had a partner—Private Alf Viney.

They would set out from their headquarters armed with as many booby traps as they could carry, and a certain amount of knowledge as to the Japs' whereabouts. They squirmed their way through the protecting screen of enemy patrols. Sometimes they spent anything up to two days, mostly on their bellies, worming through the jungle within yards of the Jap. After this period of watching, they would go by dark into the enemy lines and lay their death-traps.

Then came an order from Brigade stating that Sergeant Naismith was to set his booby traps in a Japanese position, retire to a vantage point, and observe the results on the enemy. Naismith and Viney, with four others, set out laden with many booby traps and a little food. They dodged Japanese patrols for two days; then they relieved their four companions of their burdens and pushed forward alone.

What they saw was an advance base, composed mostly of native huts. They could hear Japs laughing and talking until dark, when they went to bed, and, said Naismith, they could then hear the unsuspecting enemy snoring.

This was a one-man job. Naismith left Viney, and, festooned with booby traps, went down into the Jap fastness. He stuck his pipe between his teeth. He wasn't smoking—he held it there to keep his teeth from chattering. In the half light he moved among the huts, stringing the Naismith patents—small, chunky pieces of sudden death connected by hair-like wires to instantaneous fuses.

He set his last trap and rejoined Viney. Hidden from view, they sat on a ridge and awaited the dawn.

At five in the morning the show began. The first Jap to stir ran slapbang into the traps. Others rushed out into other traps. More came out, firing rifles and machine guns. "There seemed to be Japs flying through the air everywhere," said Naismith.

Two days later Naismith and Viney rejoined their mates.

The Generals Say:

The author has interviewed many senior commanders and observers, both overseas and upon their return from active operations, and has studied the mass of combat reports and recommendations submitted from all battlefronts.

—THE EDITOR.

IN all reports of battle experience the soundness of our tactical doctrines prescribed in War Department training literature has been confirmed. Failures or tactical reverses have resulted from disregard or misapplication of these principles or from lack of judgment and flexibility in their application.

In general, the experiences of all commanders may be summed up in the words of one commander who said: " . . . it appeared significant that when principles taught in Field Manuals were followed, good results were achieved, and deviations brought trouble."

The following points are stressed with monotonous regularity:

First: *Thorough and complete basic training for the individual, and for small units.* The training of an efficient military organization is not unlike the training of an athletic team. The prime requisites of each are: first, individual proficiency, and secondly, team play. This includes thorough discipline and training in other basic subjects such as scouting and patrolling, dispersion, camouflage, sanitation, and so forth, but above all, the expert use of individual weapons and perfect teamwork as part of the crew, squad and platoon.

Second: *Development of the offensive spirit and eagerness to close with and destroy the enemy.* A man becomes a good soldier only when he places his duty above his personal safety. This is one of the imponderables, as no one, including yourself, can be sure how you will react to combat. We may assume, however, that troops will fight as they are trained and led. It is always necessary to inculcate a disciplined fighting spirit and a realization that a price must be paid for success in battle.

If possible, untried units should be eased into their first fight. This will lessen their initial shock of battle and give them confidence. Some units who suffer heavy casualties initially do not recover for a long time. Likewise, replacements should not be rushed into battle. They should be brought in during a rest period and given opportunity to get acquainted, particularly with their team mates and leaders.

Men become tired and battle weary and this must be recognized and watched. This condition comes earlier to some men than to others depending largely upon the man's physical condition, training, and character, but it comes eventually to all men. Battle fatigue seriously affects combat efficiency and when it becomes prevalent in a unit, then it is better to introduce fresh, eager soldiers, although less experienced.

Third: *Leadership.* Leadership is a natural gift. Some men have it to a very high degree and their fellows will follow them practically anywhere, while others do not have it at all. Therefore, the placing of the right men in positions of leadership is the most important safeguard for success in battle.

It is a function of command to select and place the natural leaders in positions requiring their priceless talents and to utilize the others on appropriate assignments out of close contact with the men. In addition to selecting the leaders, we must earmark and train their logical battle replacements. A military unit works on the same principle as any championship team. Each man must know his job; there must be perfect teamwork and there must be good substitutes available when replacements are needed. Leadership is a question of life or death to the man in ranks. The weak leader must be replaced promptly or the reaction will go down to the last man and the unit will fail miserably in battle.

The chain of command functions well in military organization and, except in emergency, should not be violated, not even on the battlefield.

Success in combat demands the subordina-

tion of the individual to the accomplishment of the team or group mission. Teamwork is based on the belief that the team task *can* be accomplished, the knowledge that the leadership *is* competent, and the confidence that each member of the team *will* perform his share of the assigned task.

Our officers as well as our soldiers must know and perform their assigned tasks in combat and none must jeopardize the victory by free-lance operations, however heroic these may appear at the time.

Fourth: *Development of teamwork and coordinating the employment of the combined arms.* Close and effective coordination between the infantry-tank-artillery team is an essential requirement for success in battle. None can do the job alone. None should try. The infantry must not sit back and expect the artillery or the tanks to annihilate the enemy; neither should the infantry be committed without the close support of every available tank and artillery piece.

The artilleryman fights effectively from a position well behind the line of contact; the tanker fights behind several inches of very fine steel, but the hairy chest of the infantryman is protected only by his OD shirt. Coordinated teamplay between these three musketeers of the modern battlefield requires careful training and mutual appreciation. First of all, they each require reliable and instant intercommunication. The artillery must pave the way by smothering the hostile artillery and drive the opposition to cover; the infantry must take out the antitank guns, and the tanks must help take out the enemy infantry and their automatic weapons. It must be a fixed rule and a point of honor that neither tanks or tank destroyers will permit their infantry to be overrun by hostile armor, no matter what the cost to themselves. This is the role of the infantry-tank-artillery team. This teamplay will engender mutual respect and comradeship on the battlefield which is essential to victory.

Fifth: *Physical fitness.* The American Army ranks high in physical fitness. However, we must prepare ourselves according to our job and according to our age. This does not contemplate the spectacle of middle-aged high ranking officers running across country or otherwise competing physically with vigorous young men. The probable injury to health and the resulting loss of experienced leadership is not warranted by the results to be achieved. However, they must prepare themselves to go without sleep, to withstand the worry and responsibility of battle, and to remain calm and fit.

The infantry soldier above all others must be developed into a rugged individual. He must be accustomed to long marches with full pack, up hill and down, so that he can carry a burden, withstand fatigue, exposure in cold and wet weather, go several days without hot food or sleep, all this and more without getting sick and still retain his combat effectiveness.

Sixth: *Battlefield technique. All movement on the battlefield is necessarily slow and deliberate.* Our training problems habitually teach faulty concepts by encouraging grandstand moves and by rushing through situations in a few short hours that would require days and nights of heroic struggle in battle. This is probably the most unrealistic feature of an otherwise fine training program, and the one most difficult to correct. Time can be saved by forethought and pre-planning, by rapid decisions, and by being prepared for any emergency. The mark of a battle-wise unit is the deliberate and assured way it prepares for battle, checking on every detail and making certain that everything is set and ready for any contingency.

An objective in battle is usually won in the first try, or it is not going to be won at all with the initial setup. Failure initially may indicate the need for a greater concentration or more thorough coordination of artillery or tanks, or exceptionally the commitment of a fresh assault unit under a better leader. Most attacks that fail do so because they were not coordinated fully. The urgency of the situation may justify a piecemeal attack, but whenever possible, adequate time must be allowed for coordination to include small units.

Finance and Fiscal Activities During World War II

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COMPARISON of all phases of military activity between World War I and World War II is commonplace discussion today among military strategists, historians, and statisticians. However, few activities can produce such a tremendous change as has taken place in finance and fiscal matters during World War II, in contrast to operations a quarter of a century ago. The rapid expansion of our Armed Forces and the vast numbers of our citizens who have donned uniforms since 7 December 1941 require commanders and staff officers at all echelons of command to study and know fiscal and finance policy, not only as it affects the Army as a whole, but more particularly as it concerns the individual enlisted man or officer of the command. Today, the commander and his staff must not merely show an interest in the Finance Officer on the last day of each month —"pay day"—but rather must know intimately the problems and responsibility of this special staff officer. The issuance of War Bonds and the accounting of funds therefor, deductions for family allowances and proper and correct payments to recipients, prompt transfer of funds from overseas deposited by military personnel for safekeeping in banks in the United States, and payments of monthly allotments to dependents for support become the responsibility of Finance Officers. The prompt payment of all commercial obligations for the War Department is entrusted to the accountable disbursing officer and the fulfilment of this task has a direct effect on the commander and his staff in field operations in assuring him a continuous flow of war materials.

Historically, the Finance Department is of recent origin. Prior to 1918 each supply service handled its own finances. Commercial firms were paid by each individual service and in some cases it actually was more difficult for manufacturers to obtain reimbursement than it was to produce the goods or render the services. The Paymaster General of the Quartermaster Corps reimbursed military personnel. On 11 October 1918, Supply Circular 98 was published which provided for a "Director of Finance" responsible for the finances of the Army, including the accounting for funds and property. As a result of this action, all Army funds on the books of the War Department, which were previously under various department designations, were placed under control of the "Director of Finance." All independent departmental finance officers at the several posts, camps, stations, and important cities were abolished and consolidated into one office. Territorial zone finance offices were established in fourteen principal cities. The centralized control enabled commercial concerns to secure payment more promptly than was possible under previous methods. A single disbursing officer was responsible for the payment of obligations of all War Department agencies. As a result of this experience, the Finance Department was organized as a separate service of the War Department on 4 June 1920.

In May 1943 the former Fiscal Division, Army Service Forces, and the Office of the Chief of Finance were amalgamated into the Office of the Fiscal Director in Headquarters, ASF. Staff supervision for all fiscal and finance matters is exercised by the Fiscal Director. In addition to the headquarters organization, certain field agencies assist the Director in the accomplishment of his mission. These include the Office of Dependency Benefits, Newark, New Jersey; Army War Bond Office, War Bond Division in Chicago, Illinois; the newly organized Office of Special Settlement Accounts, New York City; in addition, personal transfer accounts are transmitted from overseas through the Finance Office, U. S. Army, New York, and the Finance Office, U. S. Army, San Francisco.

Commanders and their staff officers, being particularly interested in making certain that their troops (and their dependents) get

paid, deal mainly with the disbursing officer. At present, there are approximately 1,500 such officers doing just that job, in addition to many other things, under all kinds of difficulties and hazards. Each month, officers who maintain accounts with the Treasurer of the United States have placed to their accounts more than $4,500,000,000, and more than 2,000,000 expenditure vouchers are processed during the same period. In many instances, currency is not available locally in sufficient quantities and must be shipped in to meet the needs. In one such situation, early in the war, a problem arose outside of the continental United States which required staff coordination at the very highest echelon of command. For a number of months several millions of dollars of currency were shipped in to a key defense establishment by the local depository, and although Treasury regulations prohibited export or removal of funds, a deficit of actual currency was present before payday periods. The civilian banking authorities, together with the Finance Officer, conferred with the Defense Commander as well as with Intelligence Section officers to determine where the leakage had occurred. Finally, upon investigation it was discovered that funds spent by military personnel in the neighboring foreign territory had been deposited in local banks and had not returned to normal circulation channels. After conferences between staff officers of the Defense Command and the foreign government representatives were held, the situation was resolved in such a fashion as to obviate the need for the shipment of currency to the local depository from the United States.

In another instance, staff coordination between the Finance Officer and G-2 Section was accomplished. The Defense Command, referred to in the previous paragraph, served as an assembly area for troops which were sent to jungle and tropical areas. When large shipments of troops were being prepared for departure, a considerable number of officers and some enlisted men, individually, would close out their bank accounts with the local depository. This upset the security measures which were being rigidly enforced at the time. The relationship which existed between the Finance Officer and the local officials of the depository was used to plug this security leak. It was arranged to have a single officer appointed for the purpose of terminating all accounts of the officers and enlisted men involved, and in company with the Finance Officer, who was appraised of the move upon receipt of "Secret" orders, he contacted the depository officials and arranged for the proper transactions. Treasury checks, negotiable only in the United States, were then drawn by the Finance Officer, and the individuals involved forwarded the checks to their home address for deposit. In such a fashion only a single individual appeared at the bank and the security measures for the movement were maintained.

In general, financial and fiscal activities in connection with our foreign operations are highly technical and a complete discussion of the problems involved is not of widespread interest to staff officers. However, mention of some of the problems is significant in arousing an awareness of the scope of fiscal and financial activities during World War II in the thoughts of commanders and their staffs. The problems include planning and execution, in conjunction with the Treasury, of such matters as the funding of disbursing officers in foreign theaters; the procurement of foreign currencies at established exchange rates; depository arrangements with foreign banks; and in cooperation with our Allies, the provision of special currencies used in invasion and occupational operations.

Various plans have been developed to afford soldiers the opportunities of accumulating savings against the day of their return to civilian status, and of protecting their dependents while they are in service or in the event they may be among those who do not return.

Pay allotments are made for family allowances, personal allotments, insurance premiums, and war bonds. The size of the operations involving these activities is directly related to the size of our Army, engaged as it is in world-wide conflict. At the beginning of August 1944, there were

3,755,852 family allowance applications in effect and the monthly disbursements amounted to $238,000,000 for the month of July, of which the enlisted man's share approximated $88,000,000. In addition, officers and enlisted men were supplementing these allowances by personal allotments amounting to approximately $152,000,000 during the month of July 1944. A total of 6,193,886 checks were drawn representing the regular July payment of family allowances and Class E allotments, and mailing was completed by 1730 on 1 August 1944. This fact is our assurance to the men in the front lines that their dependents at home are receiving prompt attention for their personal needs. The monthly premium for insurance is now approaching $53,000,000 and nearly 10,000,000 individuals are covered by the allotment plans. The face value of the policies now in effect is approaching $115,000,000,000, or approximately eighty percent of the total life insurance now in effect with life insurance companies. On 31 July 1944, 2,223,650 military personnel were purchasing war bonds on a pay allotment basis, totalling deductions of nearly $37,000,000 per month. Over 2,000,000 bonds per month are being issued on the basis of these deductions. Funds received from civilian employees by 325 War Bond Issuing Officers in the continental United States, Alaska, Hawaii, Canal Zone, and Puerto Rico for the period from January 1943 through July 1944 amounted to $447,065,792, and 16,935,487 bonds were issued. Commanders of units in the areas mentioned should also be informed that since 1 September, bonds have been issued to military personnel by local Bond Issuing Officers assuring immediate delivery to troops. It should be noted that bonds authorized by personnel overseas or in combat units "alerted" for overseas duty will continue to be issued by the Army War Bond Office in Chicago.

In April 1943 a system of Personal Transfer Accounts was organized for military personnel overseas, in which facilities were provided to transfer funds to the United States through disbursing officers, who transmit the instructions by Air Transport. The messages are received and the payments made to payees in the United States by Finance Offices, U. S. Army, at New York and San Francisco. Similar facilities exist for cash purchases of War Bonds, which are sent to domestic addresses or placed in the Treasury for safekeeping. The fact is evident that the plan is functioning smoothly, since the report received on 2 August 1944 stated that less than three days' transactions were remaining in process. The number of such transactions of funds from May 1943 through July 1944 totaled 2,356,400 and amounted to $277,981,360. A total of 284,440 War Bonds were transmitted in this fashion, amounting to a cost value of $14,497,522. Staff officers of units in overseas theaters cannot fail to realize the tremendous morale value to troops who are provided a means to free themselves of worry for their families' financial status. In addition, a factor of utmost importance is the removal from local circulation in the foreign territory of considerable sums of money which might easily upset the economy of that particular section or locale. A recent report by the commander of our largest expeditionary force states that recoupments of pay by our Finance Officers on recent pay days runs up to ninety percent. Translated into other words, this means that the average soldier from private to master sergeant will retain only from $5 to $15 for his personal needs. The effect in maintaining the stability of the local price situation cannot be overemphasized in this connection. In addition, the normal service of Soldiers' Deposits is maintained, and on 1 August 1944 more than 350,000 individual accounts were being maintained, totaling not far short of $100,000,000.

In addition to the prompt payment of military personnel and the establishment of services to care for their varied financial needs and responsibilities, it is necessary that finance services be provided to keep the wheels of industry constantly moving. The loans and advances made under the direction of the Office of the Fiscal Director are in keeping with the needs of global warfare. Of the $9,000,000,000 authorized for advance payments, nearly $6,000,000,000 has actually been advanced to some 1,100 companies on ap-

proximately 4,000 contracts. Of this amount $4,000,000,000 has been recouped through deductions from the price of delivered goods. Loans in excess of $6,000,000,000 have been guaranteed, but less than $1,500,000,000 is currently outstanding.

The maintenance of accounts to provide an accurate record of funds received and disbursed by the War Department is a job of the first magnitude. To maintain such a record more than 3,000,000 postings from expenditure vouchers are made each month, and this is not a surprising number when it is considered that expenditures during the fiscal year 1944 approximated $56,000,000,000.

Comprehensive fiscal reports for analytical purposes are prepared by the Coordination and Reports Branch of the Office of the Fiscal Director for inclusion in the Fiscal Section of the Monthly Progress Report. This report has proved invaluable to those directing the war effort in pointing out the extent to which the Army Supply Program is being effectuated and obligations discharged.

The overall weight of organization and activities of a fiscal and finance nature during World War II has resulted in the accomplishment of the slogan, "Get 'Em Paid."

From a Corps Commander in France

Extract from a letter from Major General Charles H. Corlett, Commanding General XIX Corps, to the Editor of the MILITARY REVIEW.

OUR Corps staff has functioned on a 24-hour-a-day basis without interruption. We center the General Staff around a "War Tent." This has a large map board showing the G-3 situation, with a twin alongside it showing the enemy's. Supplementary exhibits are prepared by G-1 and G-4; the AAA Group; TD Group; etc. Anything of general interest is displayed here. G-2 and G-3 each keep an officer on duty at all times. Our current operations order, troop list, dispositions, periodic reports, etc., can all be examined here. Liaison officers report in and out to this tent. Clip boards in rows hold the G-2 periodic reports of Army, adjacent Corps, Divisions and Staff Sections. Visitors to the CP or Staff Officers leaving the CP can be briefed on all data affecting the Corps in this tent with a maximum of efficiency and timeliness and a minimum of effort. The system also keeps a host of visitors away from the working sections.

We think the system has paid dividends. As far as Corps Headquarters goes, methods of staff procedure and very many of the problems which arise from day to day are closely similar to those which arise in large-scale maneuvers as they have been recently carried out in U. S. A. Extensive training in such maneuvers is in fact excellent preparation for operations over here.

Some means—large and small—by which maneuvers could be made to approximate combat conditions more closely are:

1. Each exercise should be sufficiently long so that provisions for the rest of the troops and the staff would become a necessity.

2. Problems of supply and traffic-control should be played realistically.

3. Evacuation of men and vehicles and a large proportion of battle replacements should be practiced.

In addition to maneuvers, well-planned and well-critiqued CPX's would provide excellent training for many staff sections. For example, many of the problems connected with the combat activities of G-2 Section in cooperation with all of the "G-2 Teams" could be rehearsed by one or two CPX's in a way that would be highly profitable for all.

There is no doubt that our present map problems, CPX's, and maneuvers have formed an excellent foundation for the training of many of our staff officers.

The Armored Division in Exploitation

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THE armored division reaches the peak of its effectiveness in exploitation because its inherent characteristics are used to their greatest advantage. The Germans have ended many campaigns employing their Panzers in exploitation. The Allies are hastening this war's end in France in the same way.

To exploit means to utilize or take advantage of, and the plan for presenting this exploitation is to cover first certain general aspects followed in succession by a study of the problems of the intelligence section, the operations section and the logistics section, and finally a brief description of the exploitation conducted by the 1st Armored Division in Tunisia, 7-9 May 1943.

FM 17-100 tells us that exploitation is the most profitable role for the armored division. The reason for this is that its characteristics of high mobility and high fire power can best be utilized in the enemy rear areas after the breakthrough has been made. Remember that this division is three to five times more mobile than the infantry division and has much greater cannon power. Actually there are seventy-two 105-mm howitzers, seventeen 75-mm self-propelled howitzers, and 168 75-mm guns (tanks) in the armored division, which compares with fifty-four 105-mm howitzers and twelve 155-mm howitzers in the infantry division.

After entering the enemy rear areas the armored division hastens the defeat of the enemy:

1. By preventing him from reorganizing.
2. By blocking reinforcements.
3. By defeating withdrawing troops.
4. By seizing and destroying enemy supplies.
5. By disrupting command and communication facilities.
6. By destroying reserves.

There are two very important factors to bear in mind in order to hasten the defeat of the enemy. The *first* is that the commanding general has got to know where these various enemy vital points are in order to employ his force in such a way as to destroy him. Therefore, the intelligence section has a particularly vital role in providing this information, and the G-2 must use all his ingenuity and all the resources at his command to obtain information. No matter how good G-2 is, however, there will still be a host of uncertainties, which leads to the *second* equally important factor, that the organization of the division must be set up so that it can *fight at the drop of the hat* with a maximum of fire power and mobility. Hence the infantry of the base of fire must always be prepared to take over the advance when the striking force is stopped by unsuitable terrain, mine fields, or massed antitank defense.

All of the schemes of the two and three sections will come to naught if they cannot be supported with adequate supplies of fuel, rations, and ammunition. Here the command will be operating in hostile territory completely surrounded by miscellaneous enemy units. Therefore the trains will need special protection and consideration. Obviously it will increase the speed of movement if the bulk of the non-combat vehicles can be left behind and the division still be adequately provided.

Aerial support is unusually important to the armored division in this kind of action. Arrangements will be made in advance for the air to bomb and destroy certain targets as soon as they are discovered. These would be armored units such as tanks on the road and of course antitank guns, both of which could more effectively interfere with our plans than any other enemy action.

It is recognized, of course, that the armored division should not ask for aerial support on any targets that it can reach with its own guns but on distant targets—that is, distant from the point of view of the armored division, such as those mentioned as well as supply depots and enemy reserves in rear areas.

Our own air can give us immunity from enemy air, which is more important to us than anything else the air can do. This permits us to move about in these rear areas employing our mobility and fire power at will.

In some respects the air serves as additional artillery. Careful consideration should also be given to the employment of our own artillery. In general, it is always desirable to have artillery well forward, especially on the offense, and this would be no exception. Every effort should also be made to have the artillery available in such a way that one can mass its fires under division artillery control when desired.

Thus we see how exploitation requires special efforts and plans from each section. G-2 must locate vital enemy points, G-3 must plan for quick, decisive combat, and G-4 must supply with a minimum of vehicles.

G-2 Phase

One of G-2's first actions will be to make a careful tactical study of the terrain. In order to emphasize enemy capabilities, the G-2 may use special overlays, drawn in color on clear acetate sheets. The first overlay should show the terrain under consideration with a different color for every one-fifth of the total elevation involved. The next overlay would show the roads and railroads. When this is placed on the terrain the relationship between the terrain and communications net is brought out most clearly. A third overlay would show enemy battle order, and when this is placed on the other two the enemy's ability to interfere with our mission is very clearly outlined.

When G-2 first learns of the division's mission there are only about four sources of information available. These are:

Higher headquarters,
Radio intercept,
Aerial photographs, and
Aerial reconnaissance.

Aerial photographs may be useful to show:

Location of enemy depots,
Location of enemy mine fields,
Movement of enemy columns on roads,
Status of crossing along rivers, and
New intrenchments.

In brief summary, the G-2 makes terrain studies, makes aerial and ground reconnaissance requests, and assembles and analyzes information from all sources by means of which he estimates the ability of the enemy to interfere with the mission of exploitation assigned the division.

G-2 recommends that the reconnaissance squadron mechanized lead the division through its zone of action to the objective seeking and maintaining contact with the enemy.

In order to estimate beforehand in this way what the enemy may be able to do to interfere with exploitation operations, usually it will be necessary to make the following assumptions:

a. First, that the mission be to seize suitable positions to prevent the escape of the enemy.

b. Second, that the assault of other allied forces will succeed in making a breakthrough and penetration at the point intended.

c. Third, that the penetration will force the German to use his local reserves.

With these assumptions and the information at hand, the G-2 can always make a reasonable "estimate of the enemy situation."

G-3 Phase

In the planning stage, while the division is still well behind the line of contact and the final directive for the employment of this armored division has not been received, it is necessary for the division commander to assign a tentative mission or missions, or for the G-3 to assume them so that he can draw up his plans. In this case the armored division will seize and hold an objective which will prevent the Germans from escaping.

Now the G-3 must recommend the formation to be assumed considering what is most desirable on the exploitation. He must recommend the march column and plan for the control and concentration of the force to the final objective.

An important principle of exploitation stated in FM 17-100, Paragraph 74c, is that "exploitation is pushed to the endurance of

men and equipment, and is continued during the hours of darkness." This means that we must take up the ultimate formation desired way back in the rear area so as not to take the time required to shift to other formations en route to the objective. Thus the decision rests largely on the formation required to attain the objective. A balanced formation, that is, one where the division is divided equally into three teams composed of a battalion each of tanks, infantry, and artillery, might at first glance seem most desirable. Certainly these three teams could cover a wide area and would be most suitable against a widely scattered, unorganized enemy.

However, we have been directed to seize and hold a definite objective in an area well behind the enemy lines which would facilitate these exploitation operations. Furthermore, we cannot imagine any actual situation where G-2 would know enough about the enemy before the actual breakthrough is made to say that the comparatively weakly balanced formation would be strong enough to get us to the objective. Finally, the division would normally be following others making a breakthrough and penetration and might be called on by higher headquarters to come to their assistance at any time. For these reasons G-3 selects a formation that permits him to employ the full force of the division at a moment's notice. He places in one combat command a striking force of two tank battalions supported by one infantry and one artillery battalion, and in the other a base of fire composed of two infantry battalions, division artillery headquarters, and two artillery battalions, with suitable engineer and service units to both combat commands, and holds out one tank battalion for division reserve because the division will be operating alone in the enemy's rear. He also recommends that the division request attachment from corps of at least one tank destroyer battalion self-propelled and two automatic weapons battalions self-propelled. The former will move with the division reserve and the latter will provide protection for the division with priority to artillery.

Now that our formation has been selected, the division is ready to follow the other divisions in the corps toward a breakthrough provided by another corps. This formation requires that the division march in column of combat commands, and so this will be done with the striking force in the lead.

En route through the gap the G-3 has two main problems to consider. The first is to refuel the division and keep it moving with a minimum of delay after it passes through the gap, and the second is with the assistance of G-4 to cut out all the noncombat vehicles and leave them near the gap so that the division can travel to its final objective, say twenty-five miles, with maximum maneuverability. The decisions on this latter will be discussed with the logistical problems later.

The division might normally pass through the gap at night. It is considered that two hours should be ample time for refueling, after which it proceeds to its first objective. What should this first objective be? It should be a dominant feature the taking of which will facilitate future operations; or it should be an important communication center the destruction of which would seriously hamper the enemy; and it must be within artillery supporting range of the line of departure, or approximately five miles. Each succeeding or intermediate objective must have the same characteristics and be within artillery support of the next preceding. In this way the striking force can maneuver to seize any objective supported by the base of fire. When this is accomplished, the base of fire moves up to the newly seized objective and the same process continues to the final objective. If reconnaissance shows that any of these intermediate objectives are undefended, the division commander would order the striking force to proceed directly to the next objective followed within artillery support at all times by the base of fire.

G-3 will have conferred with G-2 regarding the employment of the division reconnaissance squadron, which would probably have moved out through the gap far enough so that the division could move by highway during the short time of darkness with the knowledge that there is no enemy to interfere. This also

permits selection of the initial objective beyond artillery support of line of departure.

Upon seizing its final objective the division may find that it is desirable to change to a balanced formation in order to cover more territory against a badly disorganized enemy. It controls the situation and will have time to do so.

Logistics—G-4 Phase

Obviously, the G-4 began his planning for the exploitation back in the rear area with the other members of the general staff. The division must be refueled before entering actual exploitation and must go into a final assembly area where it will also be possible to leave most of the non-combat vehicles and of course the medical and vehicle maintenance installations.

In order to assure adequate logistical support not too distant from the objective, the G-4 may recommend the following supply be taken along as far as the final assembly area:

- 1½ refills small-arms,
- 400 rounds 105-mm ammunition per piece,
- 100 rounds 3-inch ammunition per gun tank destroyer,
- 200 miles in operation fuel and lubricants.

These supplies require 178 trucks and trailers. Through the chief of staff he may obtain three quartermaster truck companies composed of 144 trucks and trailers from higher headquarters, and the remaining thirty-four trucks and trailers within the division itself.

Next, the G-4 plan would be to strip the combat elements of supporting vehicles to an irreducible minimum and push logistical support forward from this final assembly area which would probably be some twenty-five miles from the final objective.

The problem of stripping the combat elements of their supporting vehicles is determined in the following manner: First, consider the matter of supply. Rations may be dismissed, because "C" and "D" rations would provide sustenance if not satisfaction for at least three days. The ammunition on the combat vehicles should be enough for the first day's operation and more could be brought forward at night. Some few vehicles would expend all of their ammunition by reason of combat, so G-4 would recommend two trucks and trailers of ammunition per battalion be brought. The chief concern is over fuel and lubricants. The distance from the assembly area to the final objective would only be about twenty-five miles, but these would be cross-country and combat miles. With all vehicles present we can count on an average of seventy-five miles operation from vehicular tanks. By this time we do not have an average column but would have the heavy fuel consumers only, that is, combat vehicles. So using the vehicular tank capacities and other figures in Paragraph 330, FM 101-10, it shows that the tank battalions are good for fifty miles of operation under cross-country combat conditions. Again chancing bringing up supplies at night, this would be sufficient to start with. Some vehicles would run out because of their own operating conditions, so G-4 again would recommend that two trucks and trailers per battalion loaded with fuel and lubricants be brought along.

Under the heading of casualties, it is known that we must not cut down on medical assistance. The small-unit attached medical sections are indispensable. A medical company following in support will not detract at all from the efficiency of combat elements by requiring protection or by getting in the way.

Vehicular breakdown presents a more difficult problem. The G-4 considers the distance to be traveled and the time length of the operation before maintenance units can be brought forward. Again chancing the support which could be brought forward the first night, he may cut out many maintenance vehicles. He may cut out the headquarters and headquarters companies and batteries maintenance sections and the battalion maintenance sections. This leaves only the maintenance sections of the tank and rifle companies and the artillery's howitzer batteries.

G-4 knows that division will handle traffic and that the engineer companies in the combat

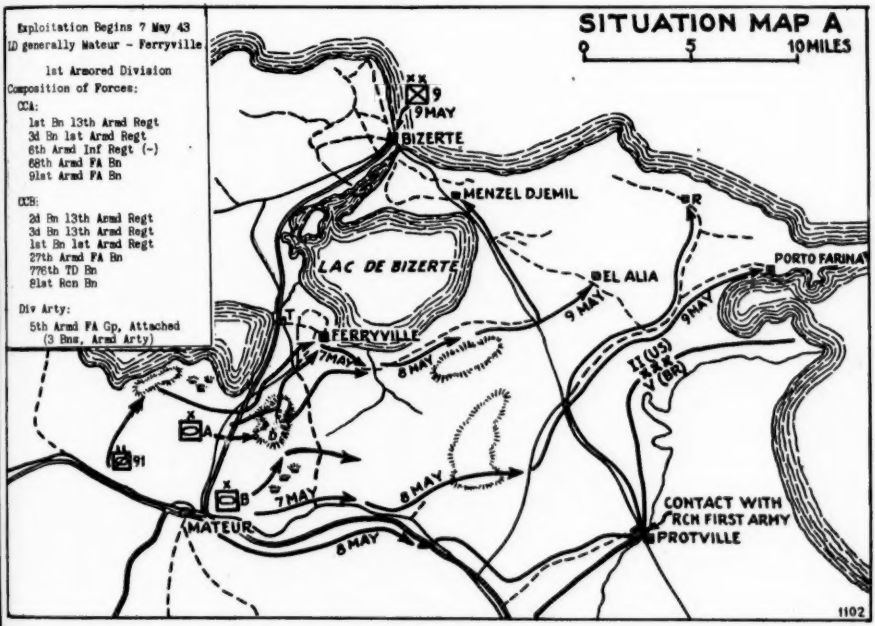
commands will have to help push combat elements forward. He may decide he must retain each engineer company less its mess and maintenance vehicles. It is calculated that the number of vehicles which would be with the division trains under this plan would be 703. These 703 vehicles would be spaced in an area equivalent to a square which would be 2,700 yards on each side. G-4, knowing the vulnerability of this large area, requests two rifle companies and one light tank company for protection.

The extreme stripping down we have shown for this type operation is very much the exception rather than the rule. But it illustrates how a commander may take a calculated risk and how our combat elements can be "stripped to the waist" for fighting when necessary.

The 1st Armored Division in Tunisia

It will be interesting to compare the foregoing theoretical exposition with the following brief outline from the experience of the 1st Armored Division in Tunisia, 7-9 May 1943. Until the present operations in France this was the most important exploitation conducted by one of our armored divisions as a unit.

The order of battle 6 May 1943 ran from north to south as follows: *Corps France d'Afrique*, 9th Infantry Division, 34th Infantry Division, 1st Armored Division, 1st Infantry Division, and the British 78th Division. Situation Map A shows the situation. The 9th Infantry Division moved up on 9 May to Bizerte. The 1st Armored Division accomplished its own breakthrough generally along the line Mateur-Bizerte Highway on 6 May, and was ready for exploitation operations the next day with combat commands abreast, Combat Command A on the north. The composition of the combat commands is as shown. The 6th Armored Infantry Regiment was so depleted that it was not possible to provide Combat Com-



mand B with any infantry though they were badly needed.

Using the line of contact 7 May for the line of departure, the 1st Armored Division began exploitation operations early in the morning as indicated. On the north end the 91st Reconnaissance Squadron, with a battalion of the 39th Infantry attached, attacked and entered Ferryville by noon on the 7th. In the center between Mateur and Ferryville the 6th Armored Infantry in Combat Command A occupied the hills "C" and "D" (Situation Map A). The tanks of Combat Command A headed east through a gap created by the infantry. Darkness found the tanks in possession of an important river bridge four miles southeast of Ferryville. The infantry arrived at dark to assist in defending the position. Meanwhile, Combat Command B had broken through to a road junction six miles east of Mateur.

On the evening of the 7th it was first decided to try to reform the division into three balanced combat commands, but due to the distance between elements of the command and the necessity of continuing the action at daylight of the 8th this plan was abandoned. Speed was the watchword, and here all attempts at coding messages for radio transmission were halted. From then on all messages were given by voice in the clear, the division commander or the chief of staff simply giving fragmentary orders to the several commanders by name. This point should be remembered when exploiting. If the enemy is off balance and speed is the essence, radio security becomes less important. The enemy cannot react in time. A German radio intercept team captured later said they knew every plan of the division but did not have time to react.

Action continued on the 8th with unabated fury, each of the combat commands was running wild in the enemy rear areas, every road was being cut, bodies of enemy troops were cut off, the division was destroying supplies and cutting wire and road communications. Great numbers of prisoners were being taken. Small groups of tanks and infantry had been split off during the day to reduce isolated bodies of troops. These rejoined their combat commands during the night.

Both combat commands had outrun their artillery; it was having great difficulty keeping up. Reconnaissance was active and the light tank battalion that had been protecting the right flank had made contact with British forces near Protville and then turned north to sweep the plain.

Dawn of 9 May saw the attack continued by the entire division. Combat Command A continued to drive eastward and to clear the northern sector. Combat Command B drove straight for Porto Farina and the last escape point left to the Germans. By 0900, leading elements of Combat Command B were in Porto Farina and a platoon leader of the 3d Battalion, 13th Armored Regiment, had in his custody three German generals who asked to be conducted to his division headquarters in order to request an armistice. By 1100 the two combat commands had 23,000 prisoners, the cease fire order was given, and the campaign was over for the 1st Armored Division.

A staff officer from Combat Command B made the following recommendations based on his experience in the Tunisia exploitation:

1. I think the greatest point is that once a breakthrough is made, speed is the essence; it is here that caution must be shelved and chances even to recklessness must be taken.

2. The elements of the division must be kept in supporting distance of each other; a battalion of Combat Command B on the morning of the 9th could have been in a very dangerous position for having gotten out of artillery supporting distance.

3. In a fast moving situation, forget radio codes; the enemy hasn't time to react.

4. Drive and keep driving. By noon of the 9th a great many men in the division had not been out of their tanks since the early morning of the 6th.

5. Don't stop for disabled vehicles unless absolutely necessary. Don't stop for anything!

6. In an exploitation there is bound to

be considerable disorder and confusion. Forget it. Well trained troops with good radio equipment can soon be rallied, and remember the enemy's confusion is a lot worse than yours.

7. Infantry is a necessary adjunct to every part of the division. Combat Command B felt greatly its lack of infantry. Especially at night is infantry necessary if tanks are to be protected.

8. Splitting off small parts of the command to reduce isolated groups and to occupy key terrain is all right *if* the commander is *sure* that he does not weaken his command past the danger point; an enemy must be very badly disorganized before this is feasible.

9. Planning must be complete, the original orders for this operation were very sketchy and incomplete; actually there was no plan made for anything after the breakthrough. When this success was achieved all orders were given on the spur of the moment and if instead of the sea being at the enemy's back, had he had a second strong defensive line, there is little doubt that the division would have received a bloody nose, for there was apparently no coordination. It worked here, but only because of terrain conditions and the status of supply of the enemy.

Thus we have seen how we plan for exploitation in advance using a strong formation with the bulk of the tanks in one combat command for a striking force supported by the bulk of the infantry and artillery in the other as a base of fire. G-2 is particularly concerned with terrain studies of several possible areas of employment as well as all the information of the enemy in these rear areas that he can dig up, while G-4 plans to provide the division with only enough supplies for the first day's mission, depending upon bringing his trains up during the night, allowing for maximum maneuverability. Finally, we know that these same tactics within the limitations of available men and material were actually applied in Tunisia, causing the defeat of the German by preventing him from regaining command and control.

Brigades and Group Headquarters

THERE will soon be additional staff personnel to provide for administrative functions in the headquarters of groups and brigades. Although War Department Circular No. 256, 1943, specifies groups and brigades of several types are tactical units, it has been found necessary for them to perform many administrative functions. Many reports from observers and others indicated this necessity and the further necessity of adding officers and enlisted personnel to these headquarters units.

War Department has directed the publication of changes in Tables of Organization and Equipment pertaining to Brigade and Group Headquarters in accordance with the proposed recommendations. The revision (tentative) calls for the following additional personnel in brigade and group headquarters of all arms and services under Army Ground Forces control: In the S-1 section: 1 Captain; 1 Master Sergeant (Sergeant Major); 1 Technical Sergeant (personnel); 1 clerk typist, T/4; 1 stenographer, T/5. In the S-4 section: 1 Captain, assistant S-4; 1 clerk, record, T/4; 1 clerk, typist, T/4.

Many attachments of battalions for short periods of time have been found to occur and sudden increases of an excessive number of units under a single headquarters have frequently overtaxed the administration and control, requiring the services of attached personnel to get essential work done. By creating T/O positions as shown above, it is believed the situation will be alleviated and group and brigade commanders can more efficiently administer the battalions under their control.

Organization of the Traffic Headquarters

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The Command and General Staff School and the MILITARY REVIEW *have received numerous requests for current information concerning the organization and operation of traffic headquarters. This article may be of some help to staffs who have not as yet created a traffic headquarters and will assist the line officer in understanding how it operates.*

The situation as described in Figure 2 is an adaptation of an actual situation as it confronted one of our divisions in Italy, and serves to emphasize the necessity for traffic planning.—THE EDITOR.

IT was not until our armies had landed in Italy and found themselves restricted in their movement by a poor road net that the full significance of our doctrine on traffic control was appreciated. FM 101-15, Traffic Circulation and Control, states: "In divisions and higher units, a portion of the G-4 section is organized into a traffic headquarters." In the light of experiences in Italy and the War Department doctrine, many headquarters are now devoting time to a consideration of the methods of operation of traffic headquarters. It is the purpose of this article to depict the functions of such a headquarters and to suggest personnel, from within the units which go to make up the command, who may be utilized for its operation.

Most of the traffic headquarters organized in current operations have utilized overstrength personnel, and called their headquarters by the British term, "Movement Control."[1] This came about because insufficient previous thought had been given to a traffic headquarters organization. It is perfectly true that the G-4 section, as a planning agency, is able to carry on the work of preparing plans for traffic circulation and control. However, when it becomes necessary to *operate* a traffic control system, as now appears necessary, we find that there is no provision within present tables of organization for corps or divisions for the organization of a traffic headquarters. Such a headquarters requires military police with a high degree of training, signal personnel, clerical help, and engineer consultants.

The amount of control which is required in order to insure a smooth flow of traffic will vary according to the road net, the number of vehicles, the amount of cross columning, and whether the situation is one of control of administrative vehicles or of tactical units. Thus the traffic control for a division moving to a concentration or assembly area will be entirely different from that inaugurated after the division is in contact.

In Figure 1, the 3d Armored Division is moving south from Area A to Area B. Routes Red and Green have been designated by corps for the movement. It will be noted that both routes cross the corps route Roix-Ressons and that in addition Route Red includes about ten miles of the corps route.

The division G-3 can no longer call the corps G-3 and get complete details of his time of movement. Instead, G-3 will turn to his own traffic headquarters which will obtain from corps traffic headquarters times for crossing of the corps routes. Since the corps traffic has become so heavy both with administrative and with tactical vehicles, all movements on the Roix-Ressons route are handled through the corps traffic headquarters.

With the times of clearance designated, the march table completed, military police at traffic posts, and guides of the combat command posted, the division is ready to march.

How will the division traffic headquarters function during such a march?

In a movement of this character its chief function will be to feed units out of the bivouac area in accordance with the actual situation on the roads rather than in blind obedience to the march table. Thus, if a

[1] "Control of Transportation in a Theater of Operations —A Review of Selected Principles." MILITARY REVIEW, July 1944, page 70.

breakdown or jam occurs on Route Red five miles south of the IP (initial point), the next march unit will be notified to remain in bivouac until ordered out on the road by the traffic headquarters. A delay such as this may, in addition to changing the time at which units cross the IP, change the time in which the division can clear the corps road. Thus corps may have planned a movement to reach Ross at the time the tail of the armored unit was originally planned to clear that point. Under the changed conditions a decision will have to be made at corps as to whether the corps movement will be held up or whether corps should have priority and the divisional march units not able to clear be required to wait. Thus the division traffic headquarters will have the additional mission of keeping corps informed of the progress of the movement.

What factors should be taken into account in locating the traffic headquarters? As basic principles, the following should be considered: first, shortest and best road communication to all routes; second, a location to take advantage of existing signal facilities; third, a location where the headquarters is able to keep abreast of the current situation.

It is not necessary for the headquarters to be at the point of the greatest potential traffic conflict. Manual direction of traffic is not its function, nor should it become involved in straightening out a local jam.

In the movement of the armored division, it might have been just as logical to have placed the traffic headquarters in the original bivouac area until movement had commenced and then to have displaced forward to Bret.

Communications between posts in this instance would be by messenger if radio silence was ordered; or if radio could be used, over the tactical command net, administrative command net, and reconnaissance engineer net. Any existing wire communication would be utilized.

If the movement had been that of an infantry division, the traffic headquarters of that unit would operate in about the same way. Radio communication would, however, be over the division command net and reconnaissance engineer net.

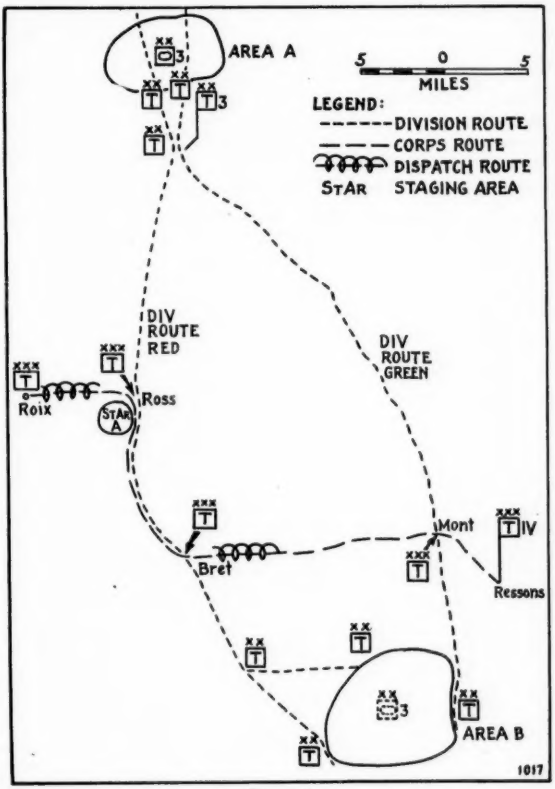

FIGURE 1.

Thus we see traffic headquarters of a division performing the following during movement of a division:

1. Calling units from bivouac as the road becomes available to them.
2. Shifting units to alternate routes when the primary route becomes blocked.
3. Coordinating movement with corps so that conflicts will be avoided.

The proper organization and utilization of traffic headquarters is even more vital after the division is in contact. In such a situation it must handle both administrative and tactical traffic. As an example of such a problem let us take the situation which faced one of our divisions in its operations in Italy as portrayed in Figure 2.

At the time of the crossing, the division was well established along the south bank of the river Vee. Route Green, the "in" road, was narrow and muddy, with steep grades and sharp curves. It could only be used as a one-way road. Route Red, the "out" road, was in better condition, but it had to be shared by our division and the division on our left. Since the latter desired to use it as an "out" road, the circulation plan as shown on the diagram was developed. In this situation, traffic control had a two-fold mission; first, to maintain the flow of supplies to the front and evacuation to the rear; second, as soon as the bridges across the Vee were constructed at the points shown in the diagram, to maintain a maximum flow of traffic across the river in order to support the holding of the bridgehead. Therefore, the solution of the division had to apply all the basic principles of traffic control in a truly "pay" problem.

Needless to say, in this situation a greater degree of control is required than in the previous example of the movement of a division. Here all routes are operated as dispatch routes. That is, no convoys of five or more vehicles are permitted on the roads without the prior approval of the traffic headquarters. Except when movement is very light, individual vehicles will have no priority and will be shoved off the road to make room for scheduled convoys. Thus, lower commanders cannot hope to dodge the system by sending out their vehicles by infiltration as single vehicles.

Note first the location of the traffic headquarters in this situation. It is in the same area as the division command post, the nerve center of the division. Under the conditions existing, if it were placed farther to the rear it would not have the advantage of being able to keep abreast of the tactical situation or of having such extensive signal facilities as exist at the command post. A location farther forward would, on the other hand, probably involve it in the action, endanger rearward communication, and tend to embroil it in local difficulties. Had the situation been purely administrative and the problem been only that of handling administrative traffic in the rear area, a desirable location would have been with the division ammunition office (DAO). There the traffic situation could be explained in detail to convoy commanders while they were waiting for their ammunition authorizations, and latest information on road conditions could be obtained from them.

In our particular situation there will be telephone communication between all posts shown on the sketch. Each traffic post will also have its own jeep. At a designated time, the post the greatest distance from traffic headquarters will send its jeep with a report on road conditions, number of convoys, and times of passing on to the next post. Finally, all reports will reach the traffic headquarters without any one post using its one vehicle except to cover on patrol the distance between it and the next post.

In order to see how the system of control works, let us follow the movement of a group of ammunition vehicles forward.

Prior to their arrival at town "SM" (from southeast corner of sketch), the convoy commander, with whom we will ride, goes on ahead and reports at the traffic control headquarters, reports the time length of his convoy as two minutes and its speed as fifteen miles per hour, and their expected time of arrival at "SM" as 0900. He is told to take Route Green, clear point A by 0925, and close in staging area A by 1030. He is further given a movement number, which he is told to write on the windshield of his leading vehicle. This identifies his convoy. As he

passes the various MP traffic posts along the route, the MP's telephone his progress to headquarters so that other movements may follow. On arrival at the staging area he is signaled by the MP on the road to pull into the staging area and he is told to disperse his vehicles until he can be cleared for busy post. We find that in addition to the three MP's ordinarily on the post there is an officer and an enlisted man detailed from one of the regiments and an engineer noncom. The officer receives all information on convoys to move over either bridge and then instructs the MP's as to directions to be

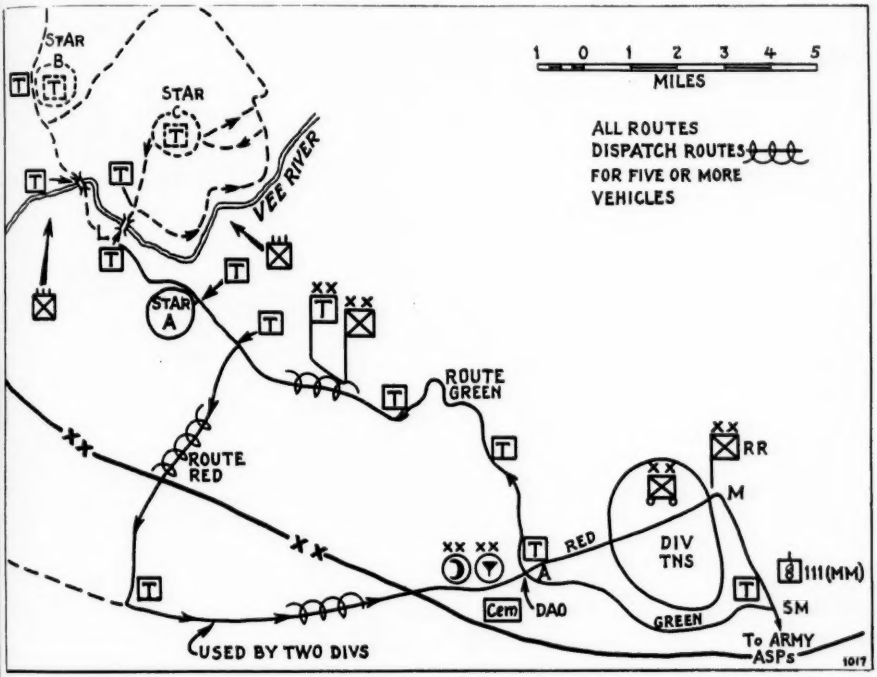

FIGURE 2.

crossing the river. When we ask why we can't go on through, we are told that other convoys have priority and that traffic control has directed that until some of the artillery has crossed, we are not to be permitted to move out. While we wait, two other convoys come into the staging area.

Finally our turn comes and we move out onto the road, turning left. When we arrive at town "L," we are signaled to turn right. If at this point we jump off the vehicle on which we have been riding, we will find that the traffic post in operation here is a very

given to the next convoy passing through. In an emergency he may reroute a convoy scheduled for one bridge over the other. The engineer noncom sees that loaded vehicles preparing to cross are dispersed properly so as not to overload the bridge. Also attached to the post is an ordnance recovery detachment to clear the road in the event a vehicle stalls.

As soon as the tail of one column clears "L," the head of a convoy of empty vehicles proceeding southeast in the opposite direction arrives at "L." This unit had been ordered

to leave staging area B by the traffic control headquarters on the basis of time calculations as to how long it would take the convoy on which we rode to clear "L."

Thus we find our traffic control headquarters getting the ammunition required through to where it's needed most, preventing jams on both sides of the river, jams which might take hours to unsnarl, getting the empties back as soon as possible to get them filled, seeing that the ambulances with wounded are given the priority which they deserve; in other words, bringing order and efficiency into what otherwise would be a chaotic situation.

Let it not be inferred that traffic control will always maintain such a tight rein over the vehicles that operate within the area of its jurisdiction. The degree of control will be in direct proportion to the amount of traffic and adequacy of the road net. There is no situation, however, where a traffic headquarters is not desirable.

Now that we have seen how traffic headquarters operate, we are in a better position to discuss their organization. Every commander will have his own ideas on what personnel should be spared for this duty, ranging anywhere from bandsmen to a group of highly trained technicians. In varying situations different numbers of personnel will be required, and likewise in some situations personnel will be plentiful while in others it will be difficult to obtain. Where such headquarters have been organized overseas, most of the personnel utilized were overstrength.

The suggested organizations for corps, armored division, and infantry division traffic headquarters set out below utilize T/O personnel only. It is well appreciated that, as with any paper improvisation, situations will occur where these people cannot be spared and others will be substituted. It is recommended, however, that a type traffic headquarters be set up as early as possible in order to give each organization at least a few persons accustomed to operating together as a team.

Traffic Headquarters—Corps

Asst G-4's

1 Major, 1 Captain; responsible for staff planning, supervision, coordination, preparation of circulation plan, *operation* of Hq.
2 Clerks.

Military Police

Provost Marshal, Technical Adviser; enforcement of regulatory measures.
Asst PM; command MP's on post and at Hq.
1 Sqd MP's from Corps Plat; operation of Hq.
(Det from Traf Plat of MP Co when atchd to Corps; operation of Hq in place of Corps Plat.)

Signal Detachment

Det Field Opns Co Sig Bn.
3 Opr Radio Plat.
1 SCR 193.
3 Opr Tp, Opn Sec—Wire Plat.

Engineer Liaison Party

Detachment from Hq Co Combat Engr Gp or from Hq Co Comd Sec of any of Combat Bns or Hq Co Rcn Sec of any of Combat Bns as directed by Corps Engr.

Traffic Headquarters—Armored Division

Asst Division G-4

Responsible for staff planning, supervision, coordination, preparation of circulation plan.

Division Engineer

Technical Adviser.

Military Police

Provost Marshal—Technical Adviser to G-4; operate traffic headquarters and traffic system. 1st Lt MP's, Division Traffic Officer; charged with setting up Hq, second in command to PM.
Staff Sgt, PFC—MP's.
Necessary MP basics from MP Plat Hq.

Signal Detachments

Detachment Radio Sec Div Sig Co, medium power.
1 Staff Sgt.
4 Tech, act as radio and Tp operators when wire communications installed.
1 SCR 506.
1 SCR 510.

Crew of Radio Half-Track—operates with Asst Div G-4.

SCR 510 and 506 in Adm net.
1 Staff Sgt.
4 Tech.

Engineer Liaison Party

Detachment from Hq Co Comd Sec, Engr Bn.
1 2d Lt, Asst S-2.
2 Tech.
This detachment may be supplemented by personnel from unattached letter company or Rcn Sec Hq when not otherwise employed.

Additional Personnel

Members of Div band may be utilized as supplementary personnel.
Additional officers may be detailed from overstrength, from Div Tns, or combat commands when necessary.
Personnel in Div Tns and CC's should have training in operations.

TRAFFIC HEADQUARTERS—INFANTRY DIVISION

Asst Division G-4

Responsible for staff planning, supervision, coordination, preparation of circulation plan.

Division Engineer

Technical Adviser.

Military Police

Provost Marshal—Technical Adviser to G-4, operates traffic headquarters and traffic system. 1st Lt. MP's, Division Traffic Officer; charged with setting up Hq, second in command to Provost Marshal.
Staff Sgt MP.
PFC MP.
Necessary MP basics from MP Plat Hq.

Signal Detachment

Detachment radio Sec Div Sig Co.
3 radio operators, also acting as Tp Oprs when Tps installed.
1 SCR 193.

Engineer Liaison Party

Detachment from Hq and Service Co, Engr Bn.
1 2d Lt, Asst S-2.
2 EM.
This detachment may be supplemented by personnel from unattached letter company of the Engr Bn or from Rcn Sec Hq Co Engr Bn.

Additional Personnel

Members of Div band may be utilized as supplementary personnel. Additional officers detailed from Regts. Personnel of each Regt and Div Arty should have training in operation of system.

If the minds of those in command do not possess great flexibility, if they are imbued with an excessively rigid dogmatism, if they have not been educated in great tolerance of opinions, they will certainly find themselves paralyzed when they meet with unexpected situations without the power of reacting to them, and consequently without even the power of responding in an adequate manner.

—General Leopoldo Mendez Lopez in *Memorial del Estado Mayor General*, Colombia.

Maps -- From an Intelligence Viewpoint

MAJOR BRUNO M. KERN
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THE recent episode wherein the Air Corps dropped several tons of maps to General Patton's rapidly advancing army brought out a phase of intelligence work rarely publicized. Few people realize that the problems of selecting the maps—and getting them to Patton—was a function of the Army Group Intelligence Officer.

Maps today represent a real problem. With the possibility of troops being rapidly shifted from one theater to another, training in the use of all types of maps becomes a prerequisite. Troops fighting today in France, Holland, and Germany have also trained in Great Britain, fought in Africa and Italy, and in the near future may find themselves in the Pacific theater. Naturally, they must be able to function with the available maps of each area. The intelligence officer bears the major share of this load as he must supervise the training of all subordinate units in the use of maps and map substitutes. In addition, he has other intelligence functions regarding maps.

FM 101-5 states: "G-2 will determine the need for maps, make recommendations as to the general characteristics of such maps as are to be reproduced, and supervise map reproduction and distribution." FM 30-5 repeats approximately the same thing: "It will be the duty of G-2 to supervise mapping activities and assure adequate supply and distribution of maps and map substitutes."

From the above it can readily be seen that G-2 has a definite and important interest in maps. The question naturally arises: Who will actually make the distribution and physically handle the maps? The answer is: The engineers. FM 5-5, the engineer field manual, charges the engineers with "surveys and mapping and procurement, production and distribution of maps." Since the engineers are handling this aspect of map supply, G-2 is left with the problems of:

1. Selecting the type of map for his organization from those available.
2. Determining the number of maps to be issued to subordinate organizations.
3. Formulating an SOP for distribution.
4. Setting up a system of priorities in the event of a shortage.
5. Checking the use of maps within his organization and preventing waste.
6. Insuring secrecy of any new operation by carefully controlling the issue of maps.

After G-2 has formulated the policy with approval of the commander or chief of staff, the engineer officer then requisitions stocks and distributes the maps. He must maintain close liaison with the G-2, always keeping him informed as to the status of map supply. One exception should be noted here, viz., in the air forces the A-2 or intelligence officer is not only charged with formulating the policy but also with the duties of procuring and distributing the maps.

Now that we have seen the division of supervision and duties between the G-2 and the engineer in ground force units, and the duties of the air intelligence officer, let us look briefly into the various classifications and characteristics of the maps that they will be called upon to handle. There are generally five classifications. Maps may be classified according to:

1. Scale.
2. Military nomenclature.
3. General terminology.
4. Type of aeronautical charts.
5. Method of reproduction.

When maps are classified according to scale they are either small scale, medium scale, or large scale. Anything smaller than 1/1,000,000 is small scale. Medium scale ranges from 1/25,000 to 1/1,000,000, and large scale is anything larger than 1/25,000.

There are also three classifications in the military grouping. The small scale used for planning purposes is called the *general* map. The medium scale map used for strategic

and logistical purposes, i. e., the location of supply points and similar installations, is called the *strategic* or *road* map, and finally, the large-scale situation map used for tactical and administrative purposes is called the *tactical* map.

Under the general classification there is the *topographic* map which shows relief, the *planimetric* map which gives the horizontal position of features, and the *photo* map which is a reproduction of a single photo or mosaic.

Aeronautical charts are broken down into five categories and are almost self-explanatory. These charts are:

1. Planning,
2. Long-range,
3. Pilotage,
4. Approach, and
5. Target.

Classifying maps according to methods of reproduction, there are those reproduced by:

1. Lithography,
2. Fluid duplicator,
3. Mimeograph,
4. Hectograph, and
5. Photo as contact prints.

So much for the various classifications of maps. Now consider that the initial issue of maps to an infantry division is 1,910 and to a tactical air command (four squadrons), 6,100. It should be easy to see the problems that will arise in stocking and distributing maps, for this initial distribution will only serve as a nucleus and in no way can be considered complete.

A word about photo maps. Since we can not depend on having large-scale maps of all the areas in which our troops will operate, it becomes necessary at times to turn to the photo map as a map substitute. However, there are some difficulties. Satisfactory mapping photography from high altitudes can be carried out at best about one day in ten. Thus, even neglecting hostile air action, weather conditions will prevent thorough coverage day by day. Furthermore, the demand on existing equipment would be too excessive to reproduce photos in the quantities needed.

Let us quote two examples from the experiences of a corps topographic company to illustrate the time and difficulties involved. It was desired to map an area with a 1/20,000 aerial mosaic in connection with the expected tactical plans for use of the corps. On the third of the month the air photographer flew once and photographed the wrong area. Next, he was delayed by weather for several days and finally re-flew on the seventh of the month. The contact prints were delivered to the corps topographic company on the eighth. Two days were required to match the photos for an uncontrolled mosaic, four feet by six feet, 1/10,000. The scale was reduced to 1/20,000, printed on two sheets, and delivered on the eleventh. In other words, eight days were required from the date the corps made the request to the date of delivery of the mosaic, and then the mosaic had little value for by that time the area mapped had already been captured. Another uncontrolled strip mosaic 1/20,000 was made of the —— area covering about forty miles. It was flown Friday, the photos were delivered to the corps topographic company on Saturday, and the printed mosaic was ready on Monday.

In addition to maps, and photos as substitutes for maps, G-2 is also charged with photos for intelligence purposes. As our lithographic reproductions improve in quality, they are becoming adequate for use as map substitutes; however, for intelligence purposes the clarity which can be attained in a contact print is a requisite.

Let us consider first what use a division G-2 will make of intelligence photos. He will use them for confirmation of information, or as a basis for establishing indications which some other agency must confirm by ground or air reconnaissance. Statements of prisoners or deserters and the indications received from some reconnaissance agency may lead G-2 to have a certain area photographed, and the study of such a photograph may confirm the information received. Some topographic feature may be indistinct on the map and a photograph may show it in greater detail. Also, from a photograph, ground indications such as roads, paths, and wire may lead to

the discovery of supply installations, command posts, gun emplacements, or defensive installations.

A further interest of G-2 should be the training of ground troops in the use of air photos to visualize the accuracy of existing maps. Too often obsolete maps are used for unobserved artillery fire and location of antitank blocks. G-2's and S-2's should also train their units in the use of foreign maps. FM 30-22, "Foreign Military Symbols," and the handbook on "German Military Symbols" provide a good basis for this training.

In conclusion, to emphasize further the intelligence officer's interest in maps, let us quote the definition of a military map, from an intelligence field manual. It states: "A military map is the result of a terrain reconnaissance and is the graphic report of the reconnaissance. It is a military intelligence terrain study presented by means of symbols. The map is as much an intelligence document as the report of the military observer and is subject to inaccuracies similar to those found in a written or oral report."

Organizing Anglo-Russian Shuttle Bombing

From an article in *The Aeroplane* (Great Britain).

THAT the planning and organization of regular shuttle bombing on a big scale between Great Britain and Russia entailed an enormous amount of hard work and clear thinking may be well imagined, but few people realize the complexity of the task which had to be faced. The operation of return bombing flights from this country [Great Britain] to Russia necessitated the establishment of a triangular radio network for the transmission of weather reports and traffic instructions, a job which was accomplished in the space of three months by the U. S. Army Airway Communication System and the Army Communication Service. The project involved selection of personnel to operate the Russian base installations, procurement of equipment from England, Iceland, and Africa, and the transport of men and operating gear to Russia and Italy.

Twenty-nine radio officers and men for duty in Russia and four additional officers to ensure safe delivery of personnel and equipment to the proper bases were selected. United States Air Transport Command arranged to fly the entire outfit, which included nearly fifty tons of radio and other material, to Russia. Three weeks after the task had been undertaken, personnel, stores, and equipment were ready to begin the move from Great Britain. Preparations were also made for the transfer of other material from Algiers to Italy and Russia. To ensure the greatest possible security, only men assigned to the job were allowed to handle the equipment. For the thirty-three selected men, that meant the task of loading and unloading all supplies and technical gear during their passage from England through Casablanca and Teheran to the Russian bases.

One man was put in charge of each airplane load and ordered to stay with it regardless of what happened, or where it went. He was given access to AACS facilities and instructed to communicate directly with London in the event of any difficulty. The success of the plan was such that, although one airplane was forced down twice in the desert, the only loss during the whole transfer was one gallon of electrolite for batteries. At the Russian bases, Soviet workmen assisted in installing and reconditioning the apparatus. On 1 May work was completed and the radio network linking units of the United States Strategic Air Forces in the United Kingdom, Italy, and Russia was ready to operate on Target Day.

"War is Dangerous"

LIEUTENANT COLONEL LOUIS DUENWEG, *Adjutant General's Department*
Instructor, Command and General Staff School

"WAR is dangerous," announced the tough, battle-wise veteran, Sergeant Dale, attempting to impress the newly arrived replacement, a youngster by the name of Allen. "Someone's always liable to get hurt—in fact, some of the boys even get killed."

Unfortunately, Sergeant Dale's rather unsuccessful try at humor contains much in the way of truth; war *is* a serious business and casualties of all types *are* suffered by combat and service troops in carrying out their missions. The problems involved in obtaining replacements to fill vacancies created by these casualties and in making the other necessary personnel adjustments are of such magnitude and importance that the War Department has directed that a separate command be set up in each major theater to handle these problems (4 May 1944). Commonly referred to as the "Theater Replacement Command" (TRC), or the "Theater Replacement and Training Command" (TRTC), its sole responsibility is to operate the theater replacement system under War Department and theater policies. Suppose we take a look at a typical theater replacement setup.

The replacement installations in a theater might well be divided into two main groups. In the first group would be placed all of the replacement depots, battalions, and personnel centers in the communications zone—these are under the command of the Theater Replacement Commander. The second group would contain all these replacement depots and battalions turned over to the field force commander (i.e., the army or army group commander) to assist him in the personnel support of his command. All unassigned personnel in the theater, except those that have been delivered to replacement units of the field force commanders, are under the control of the commander of the theater replacement system. His responsibility, in addition to that of commanding the communications zone replacement installations, includes (1) the training and utilization of limited assignment personnel and the recovery of able-bodied personnel from service echelons and communications zone activities; (2) the reception, classification, and distribution of replacements; (3) the classification of limited assignment personnel fed into the system from all sources; and (4) the maintenance of an inventory of all personnel in a casual status in replacement units or installations.

The field force commander, on the other hand, commands all replacement units assigned to the field forces. He establishes credits of replacements in his field force depots and battalions for the combat elements of his command so that they may requisition replacements direct from these installations. The adjutant general of his command may adjust these credits when unit casualties are greater or smaller than has been anticipated, operating in conformity with policies set up by the personnel section of the general staff.

If we were to place ourselves in the shoes of the replacement, Private Allen, as he joined his new organization in the "M" rest area, and look back over the various installations that had had a part in processing him, what would we find?

At the very beginning, that is, during the planning phase and before actual operations had begun in a theater, the War Department General Staff would draw up an original replacement plan. This plan would provide for the required number of replacements and replacement installations that would be needed to support the operations contemplated in that theater; it would provide for the initial personnel stockage of these depots and for such procurement, training, equipping, and shipment overseas of personnel from the zone of the interior as would be necessary to maintain the authorized theater replacement level. Each major command in the zone of the interior, Air, Ground and Service Forces, would be advised to have a sufficient number of trained replacements available in accordance with the War Department's estimate of future requirements. Once operations

are begun in the theater, the original replacement plan may be modified in order to meet actual operating conditions or to provide for unforeseen requirements.

How does the War Department keep abreast of the personnel situation existing within a theater?

First, each theater has an authorized *theater* strength which is determined and announced by the War Department. It is a total of three factors:

1. The sum of the strengths of all T/O units in the theater.
2. The overhead allotment authorized by the War Department.
3. The authorized replacement level.

The authorized "replacement level" for any theater is set by the War Department as a level not in excess of reasonably firm estimates of losses for all causes for a succeeding sixty-day period or not in excess of five percent of the total authorized strength of the theater, whichever is smaller. The War Department, however, may authorize the raising of this level when it is found to be inadequate for specific operations or due to unusual conditions.

Each month the War Department requires that each theater submit three personnel reports. The first is an estimate of the theater's future replacement requirements on a monthly basis for each of the succeeding six months (WD AGO Form No. 655). Subsequent monthly reports as they are submitted reflect increasingly accurate estimates of future personnel requirements.

The second report is the monthly personnel replacement status report (WD AGO Form No. 656) which shows a general inventory of personnel in a theater, and the number of vacancies existing in that theater for which requisition may be made.

The third and final report is the actual requisition for fillers and replacements (WD AGO Form No. 657), which, in addition to listing needed personnel, gives a monthly inventory of personnel on hand by arm or service.

These reports and requisitions are not submitted for combat crew personnel for the air force in a theater; instead, when dealing with air combat crew replacements each theater is allotted by the War Department its portion of the trained replacement combat crews available in the zone of the interior. The distribution of air combat crews is based on the total requirements of all theaters, the availability of trained crews, and the operational air priority assigned to that theater. For air force personnel other than combat crews, requisitions and reports are handled in the same fashion as outlined for ground and service forces in the preceding paragraph.

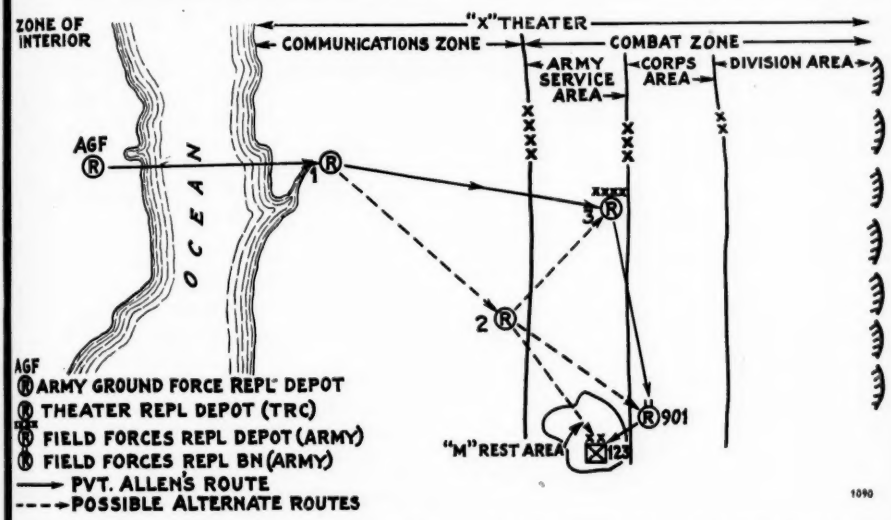
The theater commander then must anticipate the number of replacements needed to maintain the authorized replacement level in his theater and must make certain that this level will support any contemplated operations. His anticipation consists of an "educated guess" or estimate based on previous experience under similar conditions. In an established theater it is likely that replacements for Services of Supply units can be obtained almost wholly by retraining casualties from combat units that are in a limited assignment category after their discharge from medical installations within the theater. The few replacements for skilled specialists for service units which are not available in the theater can be requisitioned by military occupational specialty and specification serial number from the War Department.

In response to these monthly theater replacement requisitions, modified in some instances by the availability of personnel in the zone of the interior, the War Department directs the flow of replacements to the various theaters. It was such requisitions as described above that prompted the shipment of Private Allen from the Army Ground Forces Personnel Replacement Depot No. 1 at Fort George G. Meade, Maryland, to a replacement depot in "X" theater. Let's follow his journey by referring to the diagram on page 67.

At the Army Ground Forces Replacement Depot, Private Allen was processed to make certain that he met the requirements of POR (Preparation for Overseas Shipment of Replacements). He was then transported to Re-

placement Depot No. 1 in the communications zone of "X" theater, where additional training peculiar to the theater was given him. In response to a request from the commanding general of the field forces, in this instance an army commander, the theater commander directed that the commanding general of the Theater Replacement Command furnish the required number of replacements with varying qualifications to appropriate replacement depots and battalions of the field forces. a regiment and company. It was here that Private Allen met the loquacious Sergeant Dale. (Alternate routes that Private Allen might have followed are shown on the diagram by dotted lines.)

From the foregoing it is possible to visualize a theater replacement system composed of a Theater Replacement Command, which is in reality a huge reservoir for replacements, furnishing needed manpower to the replacement installations of the field forces



Accordingly, then, Private Allen, along with other replacements from Replacement Depot No. 1, a TRC (Theater Replacement Command) installation in the communications zone, was sent forward to Army Replacement Depot No. 3. Private Allen then was included in a group of replacements being transported to the 901st Replacement Battalion (Separate) which was furnishing replacements to units in the "M" rest area. As a result of a consolidated personnel replacement requisition submitted by the 123d Infantry Division and approved by army, the 901st Replacement Battalion (Separate) forwarded Allen and others direct to the 123d Infantry Division where he was assigned to and to the SOS units and installations in the communications zone. Once replacements have reached the field force replacement installations it is possible through the establishment of a system of credits within the field forces for division and similar units to requisition needed personnel direct from field force replacement depots.

In certain operations where organizational strength must be maintained and where it is impracticable to requisition personnel on the basis of actual losses suffered—such as an amphibious operation—periodic bulk shipments of replacements, or "package replacements," may be furnished direct to units by field force replacement depots (or TAC de-

pots) without the submission of requisitions. The number of replacements to be furnished is determined by the Morning Report strength of the unit as reported to machine records unit; the numbers of the different specialists to be furnished is based on appropriate experience tables. A recent change in War Department policy makes it possible for units in that portion of the combat zone defined by the theater commander as "the combat area" to drop their casualties as soon as hospitalized and to requisition needed replacements at once; in this way, combat units are able to maintain effective combat strength and are not required to carry non-effectives on their rolls for long periods without replacements, as was previously required. Under a similar policy, units of the communications zone drop their casualties after sixty days hospitalization.

Undoubtedly, much better control will result from the centralized command now prescribed for the theater replacement system; it is a centralization that can and must result in flexibility of operation, and should meet the replacement needs of the combat units more quickly and effectively. All staff officers and commanders concerned with the functioning of the replacement system—whether as part of the Theater Replacement Command or the field force system—must make certain that the thousands upon thousands of "Private Allens" needed to win this war are processed and forwarded to the units needing them, rapidly, efficiently, and to the best interests of both the Government and the individual.

Some Notes on Engineer Activities in France

THE outstanding impression I got from my trip was that the training of the engineer combat units that went to France was very sound and thorough. These units knew their jobs and proved it. If their training had not directly covered the work at hand, they were soundly trained in the fundamentals and were able to solve new problems as they came up.

Engineer combat units have the respect and admiration of the entire expeditionary force. Many officers from other branches, when they saw I was an engineer, went out of their way to tell me what fine work the engineers have been doing. The combat engineers are operating close to the front lines with often only a thin line of infantry ahead. I doubt that in any battle in history the bridge work has been so well handled . . . Road maintenance has been well done.

In clearing routes through ruined towns a circulation problem is involved. Which routes should be cleared first to handle the traffic in the best possible manner? . . . Very often the traffic can be handled best by the removal of buildings to widen the route and make a second route for traffic. Also, road repair work should be planned by engineers so as least to interfere with traffic, by doing the work at odd hours and not creating bottlenecks on a busy road. . .

The first step, of course, is to get a route through by clearing the main road in the direction of advance. Then two-way traffic in that direction is necessary. Here some ingenuity is required because this can be done either by clearing a two-track road or, if the road net permits, clearing two one-track roads . . .

The efficiency of the MP's in directing traffic is of a very high order, and they have a good knowledge of the location of units. This is largely due to the system of traffic control points that have been set up . . .

Basic training should place more stress on scouting and patrolling, especially night patrolling. There should be more work on map reading, not the schoolroom type but in the field. We don't have enough qualified scouts.

—An Assistant G-2 of an American armored corps

The Command and General Staff School Today

LIEUTENANT COLONEL CHARLES M. CUMMINGS, *Infantry*
Chief, Publications Division, Command and General Staff School

AS this is being written, the Twentieth General Staff Class is under way at the Command and General Staff School. Nearly a thousand officers, representing all arms and services, are students in the class. They have come from headquarters and units in the United States, from every one of our fighting fronts, and from a dozen allied nations for the ten weeks' course that will equip them for general staff duty in air, ground, and service units and installations. Five times a year the process is repeated—a new group is trained, indoctrinated, and sent forth to apply in the field the principles and techniques acquired at Leavenworth.

The Twentieth Class, to a greater extent than any previous war-time group, presents convincing evidence of the international role which is being taken by the Command and General Staff school in this global war. Campaign ribbons and shoulder patches on nearly 300 officers in the class indicate they have come from distant fronts—Italy, France, Africa, Alaska, Asia, and the islands of the Pacific. More than two score of the students represent allied partners, each with his individual and colorful uniform and insignia. Better than half of the school's instructors have had overseas experience.

All of the students have been sent to work in one of the eight courses of this army university under the quotas fixed by the Secretary of War and allotted by the War Department to the commanding generals of forces, commands, departments, overseas areas, and theaters.

The General Staff Class is divided into three major courses: Army Air Forces Courses, Army Ground Forces Courses, and Army Service Forces Courses. Each of these is further divided for the specialized instruction received by the student, dependent upon his origin or possible destination. Orders sending the officer to the school normally specify which course his commander desires him to take.

The Army Air Forces Courses include the Air Staff, which presents general and special staff duties, functions, techniques, and operational procedures of Army Air Force Commands, and the Air Staff Service Course with instruction in the correlation of Air and Service Forces installations, organization and operation of overseas air service commands. In the current courses there are 217 Air Staff students, including eight WAC officers and fifty-five Air Staff Service Students.

Approximately forty percent of the students, 436, are enrolled in the four Ground Forces Courses:

1. Infantry, with instruction in general and special staff duties, functions, techniques, and operational procedures of infantry divisions, corps, and armies;

2. Armored, with similar subjects related to armored divisions and tank destroyer units;

3. Airborne, including, in addition to general and special staff duties, limited air staff instruction with particular emphasis on Air Defense Command;

4. Antiaircraft, emphasizing Air Defense Command with general and special staff duties with ground and air combat staffs.

The Service Forces Courses, in which a total of 237 students are enrolled in the Twentieth Class including four ATS (British Auxiliary Territorial Service) and five WAC officers, encompass:

1. Service Staff Course, presenting the duties of supply and administrative staffs of the Army Service Forces, service commands and service units applicable to the zone of the interior, lines of communications, and communications zone;

2. Zone of the Interior Course, in which officers in Army Service Forces Headquarters, service command headquarters, and installations are instructed for five weeks in functions of the ASF and its field installations.

Aside from the General Staff Class, this army university also conducts several aux-

iliary or preparatory courses. Periodically held is the Command and General Staff School phase of the Army and Navy Staff College course which aims to familiarize senior Navy and Marine Corps officers in the operations and logistics of the Army's larger units, preparatory to further training for command and staff duties with joint and unified Army-Navy task forces. Army officers participate in the class for refresher purposes. Eight of these classes have been held since 1942 and another will be under way during the winter.

Brazilian officers attending the General Staff Class are given a special preparatory course in U. S. Army nomenclature. Other courses of instruction, limited to specified objectives and subject matter, are prepared and presented as directed by higher authority to senior Brazilian officers, officers of bomber commands, or to staffs of new divisions.

Seven of the eight courses run concurrently for ten weeks. The exception is the Zone of the Interior Course which lasts for five weeks. Students of all courses are instructed initially in the broad aspects of the United States at war and in the correlation of the armed forces to the national war effort. The foundation for later specialized instruction is laid by presentation of basic concepts of the organization, characteristics, and tactical employment of the various arms, the functions of the services, the technique of staff operation, the organization and employment of large air, ground, and naval combat units, and problems of application in which air, ground, and naval commands are combined as task forces.

War Department publications form the basis of doctrine taught at the school. The influence of new methods and new instruments of war is emphasized. Lessons learned from current operations are applied and the school strives to anticipate future scenes and types of operations in its instruction. For instance, during several years prior to the invasion of Normandy, students were concerned with the staff problems attendant upon landings in several areas in France including the Cherbourg Peninsula. Similarly, in the South and Southwest Pacific, problems have been sited in areas likely to be the scenes of future operations and consideration is given in exercises and map maneuvers to the various types of task forces and combined operations which may be employed. The Gettysburg and Chancellorsville exercises, familiar to the older graduates of peace-time Leavenworth, are never mentioned to the current classes.

These are full and busy days at Leavenworth. The average student rises at 0630, breakfasts at the McClellan Avenue Mess or the Student Officers' Mess, and is in his seat in his classroom at 0800. Until 1200, usually with ten-minute breaks each hour, he participates in conference discussions, tutorial committee panels, exercises, map exercises, or map maneuvers. The luncheon period extends from 1200 to 1330 when class work is resumed. The usual day's schedule ends at 1630, though some map maneuvers or special events may extend later or resume after dinner. Saturday classes usually end at 1500.

Students are urged to keep fit by daily physical exercise, a number of facilities for which are provided.

Taken from the schedule for the third week of the course, a typical day is shown on page 71.

The average age level of the students of Leavenworth's classes has been gradually lowered since 1941, when wartime classes began. In the Twentieth General Staff Class, the average age was 31.70 years. The average Ground Course student was 30.94 years old; in Air Forces Courses he was 29.75; and in Service Forces, including Zone of the Interior, 35.27.

No student for Air Forces and Ground Forces Courses must be more than forty years old. No age limit is fixed for Service Forces Courses students. The officer must be at least a first lieutenant and must have completed successfully an advanced school of his basic arm or possess substantially equivalent training and experience to be eligible for assignment as a student. He must be physically able to meet the requirements of seven hours of classroom work and three hours of study daily.

So that the families of overseas officers may be near them while they attend the

class, the school has arranged to assist them in obtaining rooms, apartments, or dwellings for families in the city of Leavenworth and in nearby towns. A committee of officers' wives from the post and the school aids in listing locations and prices. Government quarters for all student officers are available on the post.

Dates for subsequent classes have been set by the War Department as follows:

General Staff

Class	Opens	Closes
21st	30 Oct 1944	4 Jan 1945
22d	8 Jan 1945	* *
23d	19 Mar 1945	* *
24th	28 May 1945	* *

THIRD WEEK

AIR FORCES

Date	Air Staff				Air Staff Service			
	Schd	Type	Subject	Hrs	Schd	Type	Subject	Hrs
SEPT 5 Tues AM	183	C	TAF Communication and Control	1	1120	C	Duties of ASC Control Officer	1
	183A	C	TAF Communication and Control	2	1102	C	AAF Stock Control Plan	1
	99A	Ex	Reports, Records and Statistical Control	2	99A	Ex	Reports, Records and Statistical Control	2
PM	99A	Ex	(Continued)	3	99A	Ex	(Continued)	3

GROUND FORCES

Date	Infantry				Armored			
	Schd	Type	Subject	Hrs	Schd	Type	Subject	Hrs
SEPT 5 Tues AM	183	C	TAF Communication and Control	1	183	C	TAF Communication and Control	1
	151	Ex	AAA with Mobile Units	3	151	Ex	AAA with Mobile Units	3
PM	133C	Ex	Motor Movement—Organic	3	137B	C	Armored Engineers	1
					58B	C	Communications—Armd Div	1
					133B	C	Armored Division—Marches	1

SERVICE FORCES

Date	Service Staff				Zone of Interior			
	Schd	Type	Subject	Hrs	Schd	Type	Subject	Hrs
SEPT 5 Tues AM	574	C	ASF—Corps of Engineers	½	591	Ex	Military Personnel	2
	575	C	ASF—Ordnance Department	½	593	Ex	Personnel Reclassification and Reassignment	2
	576	C	ASF—Signal Corps	½				
	583	C	The JA, IG, AG and Chaplain	½				
	913	C	Finance Department	½				
	569	C	Control Officers	½				
	578	C	Special Services Division	1				
PM	597	Ex	Induction System—Reception Centers	3	597	Ex	Induction System—Reception Centers	3

The ancient elms of old Fort Leavenworth, beneath which have passed more than a century of history in the winning of the West, now look down upon an educational operation geared to modern war, applying the battle-tested methods of the moment and anticipating the military thought of tomorrow. For Leavenworth, in these days of its maturity, has become the world's greatest post-graduate military university.

Captured German Maps for Invasion of Britain

From a British source.

A COMPLETE collection of maps which the German Army had prepared for the invasion of Great Britain and Ireland was discovered in a big garage on the outskirts of Brussels. It reveals a good deal about the strategy which the Germans planned to employ.

The documents are an imposing sight. Each dossier, and there are hundreds of thousands of them, is at least eighteen inches thick and a foot square, and they contain all the data relating to every district of the United Kingdom and Eire.

There are reproductions of the best British maps; street plans of all towns and villages on important traffic arteries; photographs of every conceivable part of the country, from tin mines in Cornwall to reproduced picture postcards of the Lake District. There are maps of the entire coast, with sketches enabling any stretch of the coast to be identified at once; and aerial photographs of the defenses of the south coast hurriedly thrown up during the spring and summer of 1940. Newspaper pictures of the tours of inspection of these defenses by prominent persons are included whenever they contain details of weapons or of defensive positions.

Accompanying the maps is a kind of invasion "Baedeker" giving details of Britain and Ireland as a whole, and discussing each area from the point of view of military operations. From this it is possible to make some general deductions as to the plan of the campaign which the German Army at one time planned to adopt.

The first phase of the actual invasion, after the battle for air supremacy had been won, apparently included attempts to sink blockships at the entrance to the principal east coast estuaries and harbors, with the intention of impeding the deployment of our naval forces. Then it appears that there were to have been two main landings in the south of England, with airborne landings in the Midlands and behind the east coast. The first of the southern attacks was to have been in Kent and Sussex.

The object of the Kentish attack was to get into the Weald and thus turn the line of the South Downs, but the general purpose of this whole landing was to attract what field army Britain possessed at the time to the defense of London against an attack coming from the south. Then it seems that the second attack was to be put in—a landing in the neighborhood of Portland and Weymouth—with the intention of getting the armor into the admirable tank country which stretches from the border of Devon up to Salisbury Plain and the Cotswolds. From this position the best way into London was, according to the German notes, southeastward through Bicester, so that while the British field army was fighting on the North Downs facing south, London would be taken in the rear by armored forces. Apparently also, the Germans envisaged the final stage of the invasion of England would be a last ditch stand by the remnants of the British forces pushed back into North Wales.

A striking thing about the documents found in Belgium is that the first of them were not ready until the middle of August 1940, and were kept up to date and some revised even in 1943.

Considerations for the Employment of Mechanized Cavalry

LIEUTENANT COLONEL WILLIAM T. BIRD, *Infantry*
Instructor, Command and General Staff School

AMONG the many wails arising, all charging that "we are misunderstood, misused," is that of the mechanized cavalry. There is justification for this lament. Since these units, mechanized cavalry—a troop organic in the infantry division, a squadron organic in the armored division, and a group operating with corps—no longer act independently, they do suffer from a lack of understanding of their capabilities and limitations on the part of G-2's and G-3's on corps and division staffs. Too few G-2's and G-3's understand that these units are trained for specialized operations. Too few understand what may or may not be demanded of mechanized cavalry. Staff recommendations, and particularly requests from the staff, are too often based on a lack of understanding of proper employment of these units.

Failures in reconnaissance have been accepted by the staff as unavoidable when such failures were actually the result of poor reconnaissance technique and were often due to the reluctance or refusal of mechanized cavalry units to dismount or leave the roads and perform the necessary foot patrolling. Often the impossible has been demanded of mechanized cavalry, all due to a lack of understanding of its capabilities and limitations.

Consider, as an example, one of our newly formed infantry divisions. When first formed, the troop CO was a junior officer—probably a 1st lieutenant. The division staff also was new, with members probably serving in the No. 1 spots of the staff sections for the first time. The result was that the troop commander, new to his job and so junior that he could not demand attention, did not receive consideration from the staff. The troop suffered from a lack of senior supervision, the technique was poor, and the missions assigned were often improper.

A short study of the organization and the equipment of the troop should clearly indicate that it is not designed for combat operations—that is, sustained combat.

The reconnaissance troop with the infantry division has six officers and 143 enlisted men. When, however, we deduct the liaison group and maintenance and administrative personnel, we find at full T/O strength just one officer and twenty-eight enlisted men in each of the three platoons, plus the troop headquarters, making five officers and ninety-seven enlisted men available for missions.

Among the five officers and ninety-seven enlisted men are fifteen NCO's (platoon, section, and squad leaders), one communication chief, twenty-seven radio operators, thirty drivers, and eighteen mortar gunners and their assistants, making a total of ninety-one. This leaves just four riflemen who also serve as liaison agents in troop headquarters. So we see that ninety-six percent of the combat echelon of this troop are specialists and not too easy to replace. Moreover, this personnel has been trained in motor reconnaissance and dismounted scouting and patrolling.

Most reports from the theaters state that reconnaissance by untrained troops is not effective; that considerable training is necessary in scouting, patrolling, and motorized patrolling before ground reconnaissance becomes effective. G-1 probably will find it difficult, if not impossible, to provide trained replacements. It is therefore not economical to utilize specially trained reconnaissance personnel for routine combat missions.

While it appears that the troop has considerable fire power—and it does have for a short time—the prescribed loads, the ammunition immediately available to the weapons, are only 1,500 rounds per light machine gun, twenty-four rounds per 60-mm mortar, and sixteen rounds per 37-mm gun. Resupply is not immediately available, due to the distance that the troop normally will operate from the supply points.

Consideration, then, of the organization and

equipment should convince us that mechanized cavalry is best fitted for reconnaissance missions and not primarily for combat. However, in spite of this, cavalry units are given the mission of "securing" or "protecting" the flanks or assembly areas of large units, without proper reinforcements. Possibly one of the reasons for this is the fact that the terms "secure" and "protect" are loosely used. Units are ordered to "protect" a flank, when the intent of the directive is actually to "screen" the flank.

The term "screening" or "counterreconnaissance screen" means the prevention of hostile ground observation of our dispositions, and early warning of the approach of hostile elements. Mechanized cavalry can perform this mission, since it will have mobility equal to the hostile ground reconnaissance elements and probably sufficient fire power to fend off these hostile *reconnaissance* elements.

However, "securing" or "protecting" a flank is the means employed by the commander to prevent not only hostile ground observation of our disposition but also annoyance or attack by hostile ground units, and to preserve the command's freedom of action. Mechanized cavalry cannot stop these ground attacks unless it is reinforced.

Counterreconnaissance does contribute to security, but is not security under the above definition.

Mechanized cavalry can *watch over* an open flank, but the open flank must be *protected* by other troops.

Although all of the preceding statements have particular reference to the reconnaissance troop of the infantry division, most of what has been said will apply to the reconnaissance squadron of the armored division and to the cavalry group. The capabilities of the squadron and group are increased, of course, in direct proportion to the number of troops or squadrons assigned to each. In addition, the squadron has additional fire support in the assault gun troop and the light tank company, not available to the troop in the infantry division. Even though the capability of fighting for information is increased by this additional strength, G-2 and G-3 should not assume that the squadron, unlike the troop, is capable of heavy shock action, sustained fire power, and sustained combat, and attempt to employ it as an armored unit. The squadron and the group are both *reconnaissance* units.

War Department Training Circular No. 107, the present "Bible" of the mechanized cavalry, states the mission of mechanized cavalry as follows: "Mechanized cavalry units are organized, equipped, and trained to perform reconnaissance missions employing infiltration tactics, fire, and maneuver. They engage in combat only to the extent necessary to accomplish the assigned mission." Even though the circular is void of any reference to any secondary missions, even counterreconnaissance, it is apparent that mechanized cavalry may properly and profitably be assigned other missions, when not needed for reconnaissance.

Pursuit.—Mechanized cavalry, because of its high mobility, can, better than other ground units excepting armor, jab at a withdrawing enemy, harass him, and maintain the contact that is so vital. Similarly, by screening our own withdrawals when we have been able to break contact, it can delay hostile forces.

Antiairborne.—Airborne troops are most vulnerable immediately after they have landed. Mechanized cavalry, because of its mobility, should be effective against these lightly armed and unarmored units. Should the command have organic or attached mechanized cavalry, it could be effectively employed on this mission in an emergency. However, mechanized cavalry should not be held for this mission alone.

Liaison.—Mechanized cavalry may be used in maintaining contact between two units, particularly if one or more are armored or motorized units.

Seizing Critical Terrain Features.—Should the prompt seizure of a critical terrain feature, a defile or crossing, be necessary to the success of the commander's plans, the high degree of mobility of mechanized cavalry may permit its reaching this objective before the enemy and delay the hostile approach suf-

ficiently to permit occupation by other friendly forces. If such a mission is planned, prompt reinforcement or relief of the mechanized cavalry should also be provided for. Mechanized cavalry cannot fight a sustained defense.

There seems to be a fairly common misconception that, because mechanized cavalry is mounted, its personnel is not subject to the rigors and exhaustion common to other arms. If reconnaissance is properly performed, the personnel may be on the ground as much or more than they will be riding in their vehicles. Patrolling—reconnaissance—is just about as nerve-racking and exhausting as any mission combat troops are called on to perform. Vehicles will be moving many miles a day, without opportunity for maintenance. Radio equipment will be operating twenty-four hours a day, so there must be some time for rest, replacement, and maintenance if mechanized cavalry units are to perform efficiently.

There seems to be, too, a genuine reluctance to permit mechanized cavalry to "sit around and do nothing," as it is sometimes expressed. There should be no hesitation in placing mechanized cavalry in reserve when no proper mission for it exists. These periods can be profitably employed in rest, maintenance, and the training of replacements.

One caution to G-2's and G-3's. That is the avoidance of dual missions; for an example, reconnaissance and counterreconnaissance. In reconnaissance we orient on the enemy force, whereas in counterreconnaissance we orient on our own troops. When on reconnaissance we avoid combat; when on a counterreconnaissance mission we seek to destroy or drive off hostile reconnaissance patrols and to delay and deceive the enemy. The two missions cannot be performed simultaneously.

Consideration must be given to supply. The administrative transport of the mechanized cavalry unit is not sufficient to support the unit from regular supply points. When on distant missions, either in terms of time or space, provision must be made for additional transport, or advanced supply points must be provided. Units reporting from Tunisia indicate that advanced supply points were maintained there, and because of this efficient supply service they were able to operate with their organic transport.

Because mechanized cavalry is organized for reconnaissance, it is primarily a G-2 agency. However, G-3 will want to call on it many times, and properly so if consideration of limitations and reinforcement are not disregarded. However, it should be a command decision when mechanized cavalry is employed on combat missions. The value of the particular combat mission must clearly outweigh the need for continued efficient reconnaissance, for the battle life of mechanized cavalry on combat missions is likely to be very short indeed. This specialized equipment may not be so easy to replace by a simple requisition on G-4, and probably it will be impossible to replace trained personnel with a requisition on G-1.

Earlier in this article it was stated that failures resulting from poor reconnaissance technique were accepted, and that the impossible was asked. There have been cases, of course, of unwillingness to dismount from vehicles or leave the roads and do the foot patrolling that is often necessary. However, we must not go to the other extreme and demand foot patrolling where it is not necessary, thereby losing the inherent advantages of motorized patrolling. The situation and the mission will often demand that we take the calculated risk of staying on the roads and remaining in the vehicles.

Then too, G-2 and G-3 should have a clear conception of the capabilities of mechanized cavalry in the matters of rate of advance and the width of the zone that a unit can effectively cover on reconnaissance. Training Circular No. 107 tells us that, under favorable conditions, the troop can reconnoiter at a rate of about ten miles per hour; that normally the troop can reconnoiter a zone ten miles wide, with one platoon in reserve. These, however, are the barest guides. The road net, terrain, weather as it affects visibility and cross-country movement, and other factors may reduce the rate of reconnaissance to the rate of foot patrols. In densely popu-

lated areas with a dense road net, a platoon may be reduced to reconnoitering one route—a zone perhaps a half to one mile wide. At the other extreme, in very flat, open country with a sparse road net, the platoon may reconnoiter almost to the limit of its communications, which might mean a five to six-mile zone. So G-2 or G-3 cannot simply scale ten miles on the map and request the troop to reconnoiter that zone without taking into consideration the terrain, road net, possible enemy opposition, the weather, visibility, etc. All of these factors must be considered, too, in computing the probable rate of advance.

Another cause for complaint is the failure of G-2 to give *specific* missions; a tendency to order "Go out and find the enemy," or "Reconnoiter in zone A—B." There will be many times when, operating under such general instructions, the reconnaissance unit will not obtain many items of information that G-2 wants and expects.

It is necessary that we streamline our Field Orders to the extent possible, without, of course, sacrificing clarity. In our Field Orders we do find these general missions for the mechanized cavalry, such as "Reconnoiter Zone A to B." However, this assumes that the mission has been given in detail to the cavalry commander or his representative, either orally or by message. There is no time or place for detailed instructions in our Field Orders. We give only enough detail in the order to indicate to the interested commanders the general mission of the cavalry, but detailed instructions must be given to the cavalry if we are to expect answers to all of our questions.

To summarize all of this, we might say that these are the things that the G-2 and G-3 must remember:

1. Provide time for rest and maintenance.

2. Assign combat missions only when the importance of the mission outweighs the necessity for continued *efficient* reconnaissance.

3. Assign priority on missions.

4. Do not expect mechanized cavalry to perform security or "protective" missions without reinforcement.

5. Do not forget the resupply problem.

6. Be specific in requests for information.

7. Remember that the mission of mechanized cavalry is *reconnaissance.*

Pillboxes In Italy

By a Lieutenant Colonel in Italy, in *Aim*, army magazine of the British Middle East Command.

BE prepared for concrete pillboxes everywhere as we batter our way into Europe. We cleaned up over thirty of them in the first landing phase. They were all elaborately camouflaged. Many were covered over with brush, grass, straw, or other natural stuff. Others had cane houses built over them to represent peasant huts. All those in or near villages and towns had some kind of house over them. Some were actually covered with plaster and stucco, with windows arranged to give full freedom of fire from the embrasures of the pillbox.

In open country, pillboxes were covered with haystacks—an old trick, but bear it in mind. We dosed them with white phosphorus, especially from chemical mortars, setting the camouflage on fire, blinding and choking the gunners inside. The heat would drive them out, terrified, and they would surrender in a bunch. With white phosphorus we burnt out a position 2,500 yards long—we waited till the wind was right and then let them have it. Those pillboxes that wouldn't burn, we attacked with massed fire from mortars (including the 4.2), antitank guns, and heavy machine guns.

Vehicle Maintenance

Released by the Director, Maintenance Division, Army Service Forces

IN view of the fact that the Army's requirements for matériel continue to be extremely heavy, Maintenance Division, ASF, is carrying on its efforts to further the performance of maintenance services on all types of equipment. Near the top of the list of items for which requirements are seemingly endless are motor vehicles. Five major points in vehicle care and operation are currently being stressed, and both officers and enlisted men concerned with vehicle operation should be thoroughly familiar with them.

1. Loading.—It is imperative that transport vehicles be loaded properly to avoid damage from overloading and load shifting. Experts point out the fact that vehicles may be overloaded to advantage only if those in charge are aware of the dangers of abuse which overloading incurs. An overloaded vehicle must be handled differently from one with a normal load, no matter what the road conditions may be. Drivers must start and stop slowly and smoothly. Turns must be made with greater care. And where terrain is rough and hilly, speed must be reduced to ease the strain of jolting which may easily cause breakdowns when a vehicle is overloaded. Naturally, an evenly distributed load is essential in preventing damage. A vehicle is designed to carry a load which is supported in varying amounts by different parts of the vehicle. If the load is not evenly distributed, extra weight is placed on some of the parts and breakdowns are encouraged. That is why load shifts must be so carefully guarded against.

2. Engine Warm-Up.—This is a factor of vehicle operation that requires special attention due to the fact that racing a cold motor is a habit easily acquired when drivers are not alerted to its damaging results. This is particularly true when vehicles have air brakes and, in their impatience to get going, drivers race the engine to build up pressure in the brake system rapidly. It is pointed out that lubrication of pistons in a cold engine is never adequate and that everything possible must be done to keep the damaging action of pistons against insufficiently lubricated cylinder walls at an absolute minimum. Warming up at too slow a speed is harmful because a slow warm-up requires excessive choking to keep the engine running, and the rich fuel mixture created by choking causes dilution of oil in the cylinders. On the other hand, warming up at high speed when there is no load on the engine is equally harmful, since proper lubrication is not provided under this condition. The result is that pistons scuff and the vehicle is soon on its way to the deadline. A fast idle (the equivalent of about fifteen miles per hour engine speed in high gear) should always be used to warm up an engine, and drivers should watch temperature and oil pressure gauges to make sure everything is operating properly before starting out.

3. Expert Driving.—This is an accomplishment to which all drivers should aspire. Smooth starts and stops, silent shifting, careful maneuvering on grades and turns, and reasonable speed are all factors which contribute to the long life of a vehicle. Any amateur can drive a vehicle and eventually get where he's going, but it takes an expert to drive it without straining it to the point where mechanical difficulties set in.

4. Choosing the Proper Gear.— Drivers must be alerted to the importance of this phase of vehicle operation because of the fact that its abuse is not readily apparent. It should be remembered that straining an engine by keeping it in high gear at very slow speeds or by running at high speeds in lower gears is a sure way of damaging pistons, crankshafts, bearings, and other valuable working parts. The driver who thinks he is adhering to the rules when he descends a grade at the thirty-five mile an hour speed limit *in second gear* is mistaken. For at thirty-five miles per hour in second gear, the engine is turning over at a rate of speed equal to around 100 miles per hour in high gear! Naturally, this puts a terrific strain on every

part. Drivers should know and comply with the permissible speed for each gear, as listed on the "caution" plate attached to every vehicle instrument panel.

5. Daily Care.—Little things like checking tires, lubricants, batteries, brakes, and cooling systems save big repair jobs. Performance of daily preventive maintenance services listed on the back of the Drivers Trip Ticket and P. M. Service Record (WD Form 48) is essential.

Attention to these five points of vehicle care can do much to alleviate the strain on maintenance and supply channels in all the theaters of war. Commanding officers should take vigorous action to make sure their vehicles give the long, dependable service of which they are capable when properly cared for.

How Invasion Was Rehearsed

From *The Fighting Forces* (Great Britain) August 1944.

SECRET large-scale and small-scale rehearsals along the coast of Britain preceded the actual invasion landings. They were carried out in all weathers and were just part of the months of careful planning. In October 1943, after the strategical and tactical plans for the landing operations had been made, naval staff officers of the various landing forces involved began their task of planning in detail.

It meant arranging for thousands of men, tanks, vehicles, and ammunition to be landed on the beaches at times accurate to the minute. It meant landing naval beach parties to clear not only the shore but also the shallow waters approaching it. It meant estimating how long they would take to do their job, and how soon the craft could start beaching in quantity.

To land the men and material required by the Army meant convoys of many hundreds of craft ranging from small boats to huge assault ships. Plans had to be made to marshal all these craft so that the Army should get the material it wanted in the order it wanted it. In addition, flak ships, gun ships, and various other support craft had to be off the beaches to back up the first assault wave. Nothing on such a scale had been attempted before, though the experience of landings from North Africa to Anzio helped.

As the planning officers began to clarify the mass of detail, the first craft began to head towards the practice beaches. Small-scale rehearsals were carried out, at first with empty craft. Then the Army was brought in, and combined exercises in brigade strength took place. So it went on until, in the early months of this year, big-scale landings were being practiced.

From the great assault ships, several miles out to sea, were launched the tiny boats which take in the first troops. With these columns came the support craft and flak craft for laying a curtain of fire in front of them as they landed on the beaches. Also with this wave came the craft carrying naval beach commandos.

As the first amphibious tanks streamed on to the land, firing as they went, the clearance units got to work. Bulldozers and other heavy machinery cleared the foreshore, smashing down steel and concrete barricades and treating barbed wire as though it were cotton.

In a few hours, thousands of men would be put ashore and with them thousands of tons of material.

This would be but the first wave, the second following hard on its heels—such things as mobile kitchens, food, more ammunition, and, of course, more and more men and guns and tanks.

At each exercise the planning officers stood by with stop-watches. Tank landing craft, motor-transport craft, and infantry landing ships rehearsed disgorging their cargoes on beaches until they could do it exactly in the time required.

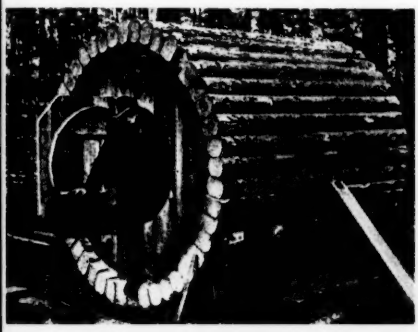
Staff planning officers went to sea with the fleets, working right up to the last minute, advising the senior officers, correcting and revising the plans they had been living with, even sleeping and eating with, for many months.

MILITARY NOTES AROUND THE WORLD

GERMANY

Wooden Roller Bunkers:

In wooded areas of the eastern front, German engineers are building these new-type roller bunkers which are equipped with bunks to accommodate four men. The bunkers



are rolled to the main line of defense by means of a team of horses. They are then dug in to a suitable depth and heaped over with earth.

(*Wochenschau*, Germany)

Q-Boat Methods in Trains:

German trains beating a swift retreat from the French battle lines attempted to trap British and American low-flying strafing planes by waiting until the attacking craft reached a low point over the cars, then dropped the sides, uncovering rapid-fire anti-aircraft weapons. Reports from the front state these hidden Bofors have not been very successful, however. The trick is similar to the German Q-boats used in World War I, when disguised freighters and fishing boats caught many submarines and destroyers off guard by opening up with hidden guns when investigating craft drew within range.

(*Marine Corps Gazette*)

Use of Turrets from Knocked-Out Tanks:

The Germans in Italy have been using turrets from knocked-out tanks to form miniature strongpoints, and in Normandy the tank-turret fortress was perfected to such a

point that even the British 17-pounders found it extremely difficult to dislodge the enemy. The rocket-firing Typhoons, which dive right onto these strongpoints, have found them exceedingly difficult to hit.

The photograph shows a tank-turret strongpoint in the Hitler Line. The turret, mounting a long-barreled special 75-mm gun, is removed from the tank, sunk low in the ground, and embedded in an apron of cement surrounded by an earth and rock covering. Beneath the ground level is an excavation to house ammunition and crew, and around the

whole are barbed-wire defenses and a liberal sprinkling of all sorts of mines.

(*The Sphere*, Great Britain)

Mine-Detector:

A German mine-detector captured by the British in Italy. With its search-coil ahead of its rubber-tired wheels, it transmits reactions through the handle bar.

(*The Illustrated London News*)

U. S. S. R.

Airplanes with Loud-Speakers:

Airplanes fitted with loud-speakers are being used by the Russians to spread propaganda and lower the morale of German troops, according to reports emanating from German sources.

(*The Aeroplane*, Great Britain)

JAPAN

Japanese Tanks:

Japan has at her disposal highly effective tanks, among other kinds of war equipment. Two types of medium and two types of small tanks mount cannon.

As a medium tank the Japanese employed, to begin with, the 11.1-ton Vickers MKC tank which came from England and which is armed with one 57-mm cannon and four machine guns and is heavily armored. Next, they developed from this the highly efficient 14-ton tank which is equipped with one cannon and two machine guns and which, according to *Deutsche Wehr*, was used as far back as the Chinese war of 1932 and is now again being used in the war against China.

The Japanese also used in the Chinese war a seven or eight-ton tank, the Etsu. This tank is no longer manufactured, however, and has been replaced by a small Japanese tank with one cannon.

The Japanese also have a three to four-ton tank, the M2592, which is equipped with one 20-mm cannon in the turret and has a crew of two men.

(*Army Ordnance*)

BURMA

Indian Field Broadcasting Unit in Burma:

Details about the Indian Field Broadcasting Unit in Burma have long been secret, but it is now revealed that the unit uses loudspeakers and fires leaflets and newspapers from mortars. During the battle for Imphal, the Burmese news sheet, "The Spirit of the Air," was dropped for the civilian population, along with the Japanese language *Gunjin Shimbun* ("Battle Newspaper") edited for the Japanese soldiers. IFBU's Japanese newspaper was favorably received by the enemy. A Gurkha patrol came upon four Japanese soldiers so engrossed in the current issue of "Battle Newspaper" that they had lost all interest in the battle itself.

(From a British source.)

GREAT BRITAIN

The Bailey Bridge:

The Bailey bridge is one of the Allies' most effective weapons. It has enormously increased the ability of our forces to move rapidly across water obstacles. It is a pre-

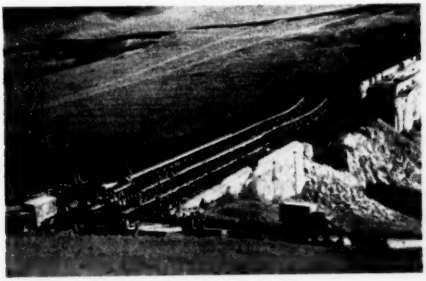
A TRIPLE-TIER BRIDGE BUILT BY A FIELD COMPANY OF ROYAL ENGINEERS IN ENGLAND. EACH SECTION IS TEN FEET LONG AND IS MADE UP OF ONLY SEVENTEEN PARTS.

fabricated sectional bridge which is put together from interchangeable parts and can be extended to almost any length, or strengthened or added to as required.

The bridge itself consists of a series of interchangeable lattice-work panels of electrically arc welded special steel. These panels can be put end to end, as many as you like, and fastened together by steel pins inserted in holes. The pin is then locked by a split pin. Each panel can be easily lifted and carried by six men. Two lines of these connected panels, with steel beams laid across between them to carry the roadway, form the simple framework of the bridge. The roadway itself is built of wooden planks, all ready-cut to standard size, and these are dropped into position and held down by a curb which is bolted down with hook bolts with captive nuts.

The construction is simplicity itself. There is no noise of hammering; the bridge can be erected silently under cover of night.

Building crews of about forty men can handle these bridges after a week's training. They put the bridge together silently on the bank and then launch it; that is to say, they



ROYAL ENGINEERS CONSTRUCTING A BAILEY BRIDGE OVER A ROAD GAP IN ITALY. THE BRIDGE IS CONSTRUCTED ON ONE SIDE OF THE GAP AND PUSHED FORWARD SECTION BY SECTION.

move it forward on rollers. It has an extending nose, and as this nose touches the other side it bears the weight until the rest of the bridge has been rolled forward into position.

It is difficult to destroy the bridge structure completely by aerial bombardment. Some parts may be damaged by a direct hit or a near miss, but thanks to the interchangeability of the parts, the damaged part can be quickly and easily replaced.

(From *Britain*, British Information Services. Pictures from *The Sphere*, Great Britain.)

Chasing Cyclones:

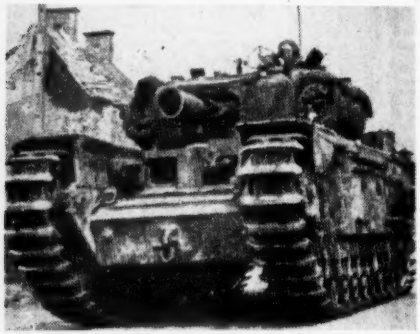
One of the most unusual jobs in the Royal Air Force is that of two British officers who chase cyclones in the Bay of Bengal. Using a long-range aircraft as a flying meteorological station, they fly out hundreds of miles over the often treacherous bay to look for the violent storm which land reports suggest is blowing up. Deliberately they seek the ominous banks of cloud which signify bad weather and often fly through worse weather than pilots ever experience on operations. The flying meteorological station was brought into use when it was found that ground reports might not give enough warn-

ing of the devastating cyclones which spring up in this part of the world. By locating bad weather in the Bay of Bengal, as much as three days warning of its approach can be given.

(*Britain*, British Information Services)

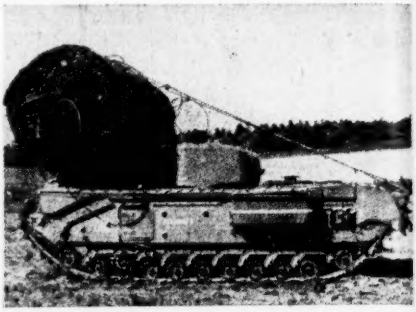
AVRE:

The main equipment of the Assault Royal Engineers which contributed to the success of the landings in Normandy was the Armored Vehicle Royal Engineers, or "AVRE." The vehicle is, in general, similar to a Churchill tank, the interior of which has been



AVRE, SHOWING SPECIAL MORTAR.

specially designed to accommodate a crew of engineers, together with specially safeguarded explosive charges for use in assault demolitions. A feature of the exterior is the short stub barrel of the special mortar mounted in the turret—the main armament of the AVRE, known colloquially as the "petard." This weapon is able to hurl a charge containing many times the weight of explosive of any other known projectile of similar dimensions against concrete, steel, or masonry obstacles. This bomb has been given the nickname of "Flying Dustbin." The AVRE is also equipped to carry and place in position carpets of flexible tracks to enable following vehicles to cross beaches, sand dunes, or patches of marshy ground. It may, alternatively, be mounted with a fascine [large roll of chestnut palings]. As soon as a ditch or stream presents a barrier, the fascine is dropped and forms a causeway across which other tanks may pass. Wherever antitank walls (some of concrete ten feet high and ten



AVRE WITH FASCINE IN POSITION.

feet thick), road blocks, or steel obstacles hold up the advance, the AVRE is called for to blast a path for the advancing armor.

(*The Times Weekly Edition*, London. Pictures from the London *Times*)

Pathfinder Technique:

The Pathfinder technique of target marking, developed originally to aid RAF night bomber squadrons, has now been applied to daylight operations. The application of this technique around the clock means that the Allied heavy and medium day and night bombers are independent of weather conditions over the target area, and thus able to attack given targets accurately by night or day.

The Pathfinder technique, first used in 1942, depends upon secret navigational aids, which enable specially-trained crews to locate the target without delay. In clear conditions the Pathfinders, operating at night, would mark the target with colored incendiaries produced for the job. In part-cloudy conditions they would mark the ground and hang flares in the sky. When the target was totally covered by a cloud layer they would mark out the cloud base with flares so colored and arranged that the bombers were able to run up on the cloud base and bomb through it to hit accurately the unseen target below.

When American Fortresses and Liberators began bombing over Europe, it was soon found that visual conditions were essential to effective operation. First the American squadrons adopted the British aids to navigation. Next development was the application of the Pathfinder technique to daylight bombing. Special means of marking the target and the cloud base if it covers the target have been devised.

(From a British source)

INDIA

Airborne Mules:

During the recent airborne landings in the heart of Japanese-occupied North Burma, pack animals, including mules, were transported by aircraft for the first time.

The news that mules were successfully moved, not only by transport Dakotas and C-47's but by glider as well, will be of considerable interest, not only to jungle tacticians, in whose plans the mule looms largely, but to all who have had to do with the actual handling of the animals.

Transporting mules—even by motor transport or rail—is normally an undertaking not without interest and excitement. Carrying mules in air transports and gliders is something which many experts would have been prepared to describe as impossible. In the recent landings, however, many mules were safely taken to the landing strip by air, and they played a valuable part in the construction of the airfield.

(*Indian Information*)

UNITED STATES

Ages of Officers:

A survey of ages of officers, excepting generals, of headquarters of the XIV Army Corps, veterans of Guadalcanal, Bougainville, and New Georgia, reveals that the average age is thirty.

Average ages by ranks are: colonel, forty; lieutenant colonel, thirty-four; major, thirty-two; captain, twenty-nine; and first and second lieutenants and warrant officers, twenty-seven. All officers of the headquarters served with front-line units before joining the headquarters.

(Press Relations Officer, XIV Corps)

American Propaganda Section in France:

This "broadcasting company" is calling on Germans in St. Malo to surrender to the Allies. When the picture was taken, enemy snipers were still operating in the streets of the town, hence the guard armed with rifles. The Americans achieved considerable success with this method of "psychological warfare" in both Normandy and Italy.

(*The Sphere*, Great Britain)

Jet Engine for Robot Bombs:

The Ford Motor Company and several other contractors including Sperry, Jack and Heintz, Republic, and Bell Aircraft are producing jet-propelled robot bombs for defense study and experimentation. Engineering details were worked out by engineers at the request of the air technical service command following reconstruction of a German robot engine from parts shipped from England. Ford produced a robot bomb engine in 1918 but World War I ended before it could be tested.

(From a news report)

Custom-Built Rescue Kits:

Special emergency equipment is available at Wright Field's equipment laboratory for AAF units operating over unusual terrain. Air Transport Command's India-China Wing, for instance, needed a complete, but specialized, rescue kit containing both arctic and tropic accessories for crews that might have to bail out over the snow-covered mountains or tepid jungle valleys of the Hump run. On ATC's specifications, 250 of these kits were assembled and dispatched to India in a period of a few weeks. Because hundred-foot high jungle growth completely swallows up parachutes, a 300-foot red and white streamer was attached to the kit to facilitate spotting of the supplies by survivors on the ground.

(*Air Force*)

Land Odograph, M-1:

A land odograph, M-1, has been developed by the Army for automatic plotting of the course taken by moving vehicles. It consists of three principal units; compass, plotting unit, and power pack, interconnected by cable and flexible shafts. The device can plot to any scale from one to 20,000 to one to 500,000. The Azimuth dial indicates the direction of the vehicle at any moment, and counters indicate the number of miles traveled east, west, north, or south of a given starting point, and the total miles traveled. The odograph can be used in mapmaking or navigation.

(*Marine Corps Gazette*)

UNITED NATIONS

Mixed Armies:

It is convenient to refer to the Allied armies by the nationalities of their main components—the American Fifth Army, the Canadian First, or the British Eighth. Convenient as this is, it does rather obscure the remarkable way nationalities have been mixed up in this war. This point is emphasized by the report that the spearhead of Lieutenant General Stilwell's advance in Burma down the Mogaung-Mandalay Valley was the British 36th Division.

The British Eighth Army under Lieutenant General Sir Oliver Leese is probably now the most international army in the field today. Counting its artillery and its lines of communication personnel, it has probably a larger proportion of United Kingdom troops than any other nationality, but it has also Polish, Indian, New Zealand, Greek, and Italian Army units.

Lieutenant General Mark Clark's American Fifth Army is another instance. When it first landed at Salerno it was then about half American and half British, including as it did, the British 10th Corps. At Anzio, also, the Fifth Army contained a substantial number of British troops, while for the advance on Rome a French corps was also included under General Clark's command. And in the Gothic Line we learn that the 6th South African Armored Division and a British infantry division were with the Fifth Army in the Pistoia-Florence area. It is now announced that the Fifth Army contains Brazilian formations.

Such internationalism is not confined to the Italian theater. The Canadian First Army contains Polish and British divisions, and there are Dutch and Belgian units as well.

The American First Army before the liberation of Paris included the 2d French Armored Division, while General Patch's Seventh American Army, which landed in the Riviera, is now more correctly referred to as a Franco-American army, containing as it does a high proportion of French Army troops.

In Burma, General Stilwell's force (besides the British 36th Division) contained Americans, Chinese, Gurkhas, and Cachins; at one time it also included the famous British "Wingate's Raiders."

It may also be noted that an ordinary Indian Army division contains three British and nine Indian infantry battalions, while the artillery is predominantly made up of troops from the United Kingdom.

(From a British source)

FOREIGN MILITARY DIGESTS

Staff Training for Total War

Digested at the Command and General Staff School from an article by Lieutenant Colonel R. S. Little, Royal Artillery, in *The Journal of the Royal United Service Institution* (Great Britain) August 1944.

THE present conflict is now properly regarded and described as "total" war. Nations actively engaged in hostilities have all realized, some rather later than others, that if the war is to be waged successfully it is necessary to coordinate every phase of national life and to weld both civilian and military services into one powerful machine. The realization that the armed forces, the civilian population, and industry are interdependent has grown steadily, and with this understanding has come into being a multitude of committees—military and civilian, served by an ever-increasing number of liaison and other staff officers.

There is no fundamental difference in the operation of a civilian or a military committee, though detailed procedure will vary; and both, to be successful, have need of the best trained staff officers that the country can produce. The staff officers we have at present are men of varied and frequently wide experience, and many of them carry out their duties admirably. But it is certainly true of them to say that very few have been specifically trained in the working of this total war machine.

Military Staffs

Britain has for long years clung to the belief that wars can be won by professional Services, and it has been considered that, if we vastly increase their numbers when war breaks out and provide them, eventually, with equipment, then the war will be settled with a minimum of disturbance to civilian life. This dangerous attitude has brought us nearer to disaster with each successive war, and there is some sign now of an increasing general interest in the military problems that beset a country when war breaks out.

Attention has been directed in particular to the complete interdependence of the three armed Services and their need for the closest possible staff coordination. Apart from tactical problems on the field of battle, it is necessary to find some way in which priorities may be discussed and decided in relation to the total belligerent effort and not in relation to prejudiced and age-old traditions of seniority and service. Chiefs of Staff committees and subcommittees have been formed and have operated with success, but many of the officers who serve on them have insufficient all-round experience and have prejudices which die hard, so that the results of their deliberations may well be compromises rather than clear-cut decisions giving the best possible answer to the problem raised.

What is needed to operate the modern, and future, war machine is a large body of well-schooled staff officers, versed in all the requirements needed for carrying out total war, and capable of coordinating not only the armed forces but also the scientific and industrial resources of the nation. This is a tall order, and one which cannot be fully satisfied at the present time, though greater

coordination of the Staff Colleges is desirable and could well be achieved even under present conditions. However, no matter what we do or do not do during this war, we can and should plan ahead to ensure that the staff officer of the future will be trained in the art of total war rather than in the narrow strategy of civil, sea, land, or air war alone.

The Future Staff Officer

The efficient business executive and the efficient military staff officer have many characteristics in common. The staff officer today must have carried out his tour of operational duty with troops, so that he has practical experience on which to base the orders he writes and the plans he makes. He has two main responsibilities. The first is to his commander, whom he must serve loyally and to whom he must give clear, accurate, truthful, and forceful advice. The second is to the troops who fight the battles. They must be directed, positioned, and supplied in such a way that they can carry out the orders of their commander with the least possible delay and loss.

To fulfil these responsibilities the staff officer must, above all, know his job supremely well. The tempo of war today is fast and there is no time to try to learn the essentials of a new job while the battle is on. So the staff officer must be well and completely trained before he handles formations in battle. With knowledge at his disposal he will develop the calm, unhurried manner which is one of his most necessary characteristics, particularly if things go wrong. His knowledge of military affairs must be a broad one. He will be waging cubic war in battle, a vastly harder problem than was linear war, and one which will demand a full and general understanding of the sea, land, and air arms and the tactics and weapons that they use. He will be a specialist in one branch himself, the one in which he serves his operational tour of duty, but he must also know a great deal about all other branches. He will often form part of a combined staff with allies, and so he must study the methods and organization of our allies at the time, together of course with the methods and possible action of the potential enemies he may have to fight.

In addition to his military knowledge, the staff officer must have some knowledge of propaganda, economics, and civilian affairs. With increasing educational facilities, the fighting man of the future will have to be given more factual information about his country's effort than was his brother in the past. His morale will be more subject to fluctuation, and increasingly he will need to be convinced of the rightness of the cause for which he is fighting and of the reasons for the sacrifices and hardships he is called on to bear. In foreign countries the staff officer will need also to understand the methods of civilian affairs more than in the past.

Finally, the future staff officer must appreciate the importance of science in war. He must understand that the success or otherwise of his country will largely depend on keeping ahead of the enemy in development. He must not look askance at the arrival in his headquarters of a long-haired, red-tied individual who does not conform to any known pattern of life. On the contrary, the staff officer must collect information and ideas from all possible sources, sift them as best as he can and then pass them on to the scientist. The staff of the future will always have scientific advisers at hand to assist, and the staff officer will have to play the part of the practical man. He must weigh the advantages and disadvantages of new developments on production and tactics to see that continuous modifications do not completely hold up the production machine and yet, on the other hand, that we do not fall technically behind the enemy.

The Staff Colleges

Up to the outbreak of war, each Service trained its own staff officers. There have been separate Naval, Army, and Air Force courses, at home and abroad, running for periods of one to two years. In the case of the Army, entry to the Staff College was by examination, and candidates came from all branches of military life. The syllabus for

each course was naturally planned to suit the ideas and requirements of the Service concerned, and only for about one week did the officers of all Services meet together to study a combined problem. Even then they acted as specialists in their own Service and did not consider the problem generally as staff officers of a British war machine; they were trained as individuals of Naval, Army, or Air Force staffs, absorbing the inherent prejudices of their kind. Some higher commanders and staff officers went through a course at the Imperial Defense College, where the problems of Empire defense were studied in all aspects, but their numbers were small.

On the outbreak of war in September 1939, all Services found themselves short of officers, and staff training arrangements had to be considerably modified. The Imperial Defense College and the Naval Staff College closed. (The RN [Royal Naval] Staff College re-opened with a much reduced course in September 1943.) The other Services shortened their courses to three to five months of high-pressure work, thus increasing output, and the Army course was considerably enlarged in intake. Naturally this meant that still less time was given to combined staff study. It is true that Army and Air Force officers have attended each other's courses, instructors have been interchanged, and some lectures and problems are also included on each course to bring in the other Services. Only in one case, in the Middle East, have full courses of Army and Air Force officers lived and studied problems together, and even in this case they have been attending separate courses of different lengths, not a completely integrated course which would train staff officers capable of filling either Army or Air Force posts.

It can be seen, therefore, that each Service has continued during this war to teach its own organization and requirements instead of the broader principles of total war. The result has been that many staff officers have found themselves almost entirely ignorant of their fellow Services when they have been called upon to plan a combined operation; and it is as well to remember that our military effort almost always consists of combined operations. Officers have found innumerable variations in staff procedures and organization, and they have had to waste time learning facts which should have been basic knowledge, and in dovetailing divergent methods of carrying out staff duties.

Speed is an important factor in achieving success in war and it is certain that some of our operations would have been planned and organized more quickly and efficiently if commanders had had at their disposal a body of staff officers trained to a standard staff procedure and knowledge of the requirements of all Services. The experience we now have has been gained at a considerable cost of time, lives, and equipment, much of which would have been obviated if staffs had been fully trained beforehand for total war.

A Common Staff Duties Procedure

There is no reason why the three Services should not write their appreciations, orders, messages, and letters in a standard way; nor is there any reason why their office routine and filing systems should be quite different. In this war we have had considerable experience of combined staffs, and it should be comparatively simple to work out a common staff language for the future staff officer to learn. We should therefore set up a committee now to examine the existing methods of staff work, to take evidence of Service needs, and then to produce a language and procedure which should be made standard for all staff work. Such a grammar of staff duties would become the basic textbook for all Service schools and colleges.

Syllabus for Staff Courses

So far, it has only been suggested that the staff officer should learn a basic procedure of staff duties and that he will in future require much greater knowledge than in the past. His training should be divided into three parts. Part One, or Basic Training, should last for four months, and the syllabus should consist primarily of staff duties. In addition, the general organization of the civilian and Service departments would be

taught. During Part Two, which should last for four to six months and consist of specialized training, the Army officer would learn Army tactics and organization in detail; the Air Force officer, those of his own Service; and so on. Part Three, or Advanced Training, would continue where Part One left off, by study of the strategic and tactical considerations of total war. The propaganda, scientific, historical, and economic aspects of war would be dealt with during the year devoted to this part of the course.

During each of these parts of the staff course, work would consist of lectures, individual and syndicate exercises, and discussions. The exercises in Part One would be on staff duties, those in Part Two would be specialized naval, army, or air problems, and those in Part Three would be complicated syndicate tasks embracing all aspects of total war planning and tactics. Every officer would be taught to handle sea, land, and air problems with equal facility.

The syllabus should be designed throughout to allow the maximum possible time for study and writing original essays and papers. During Part Three there should be discussions in which members of the Government, Civil Service, scientists, and industrialists should take part.

Having finished this course of eighteen to twenty months, students should be attached to Services and branches other than their own for a period of four to six months for practical experience of other arms. The officer with only operational experience would discover just what problems have to be met by the administrative officer and vice versa, and each Service would have a chance to experience the practical difficulties met by the others in carrying out orders.

The aim throughout should be to conduct study on a university rather than a school basis and to allow as much freedom of expression and development of individuality as possible.

A College of War

It remains now to consider where and how these courses should be run. The present Service Staff Colleges in this country should be replaced by an entirely new College of War, which should become the University of the Armed Forces. In time, this college would build up a new tradition, and the narrower Navy, Army, and Air Force loyalties would be replaced by a pride in and allegiance to this Alma Mater. Its graduates would become the leaders and staff officers of the country in time of peace and war. It should be near London so that liaison with Government Departments would be easy to maintain.

Entry to the college should be decided by record of service and interview. There should be an upper age limit of thirty-five years of age for the normal courses. The military students should be drawn from all arms of the Services, together with Dominion, Colonial, and possibly Allied representatives, and they should be of the rank of lieutenant colonel or its equivalent. Special courses would also be run as refreshers for politicians, civil servants, higher commanders, and staffs.

The task of this college should be threefold. First, it should run general courses of the kind discussed above, in which both civilians and Service officers would study problems together. Secondly, in conjunction with the Directors of Service Departments, it should revise and produce military manuals and text books. Thirdly, it should act as a general research body for military affairs. Officers should be permitted to join the college for a period for original research work, and new strategic and tactical ideas should be studied in discussion courses run for higher commanders and staffs, politicians, civil servants, scientists, and industrialists.

It should be the aim to make this College of War the center of our national military life. It would be able to train a large body of staff officers for the exacting requirements of total war and, by acting as an intellectual center for military thought, its existence should prevent the neglect and stagnation which normally overtake our armed forces in time of peace.

Soviet Aviation Versus German Reserves

Translated at the Command and General Staff School from a Russian article by Colonel M. Komarov in *Krasnaya Zvezda* (Red Star) 7 March 1944.

DURING our present offensive operations, the Germans continue to attach great importance to maneuvering their operational and tactical reserves. Whenever a sector of their defense is threatened with a breakthrough, they bring reserves from adjacent sectors of the front. Recently, such movements of German troops along the front, particularly of tank and motorized units, were observed quite frequently. By this means the German command attempts to cope with the shortage of reserves in the rear.

For example, when our troops broke through the enemy defense and encircled a considerable enemy group north of Zvenigorodka and Shpola, the German command immediately moved two tank units from an adjacent sector to the breakthrough area. Before they reached their destination, however, a blow was inflicted on the Germans in another sector. This compelled the command to send there part of the forces originally ordered to the sector of Shpola. One division which had not completed its deployment was forced to turn around and march back.

It is interesting that the German command quite often uses its elite divisions for such maneuvers. They play the peculiar role of "fire brigades," destined to save the situation on the threatened sectors of the front.

Such use of the reserves may be prevented to a large extent by our aviation. Experience shows that in a few cases, due to the systematic action from the air, heavy losses were inflicted on the German reserve units even before they were committed in battle. It should be noted, of course, that this is not an easy task. The Germans try to move their reserves secretly, and most frequently under the cover of darkness, which makes the action of our reconnaissance difficult. Moreover, the maneuver is often carried out at a great distance from the front line, and it is impossible to make full use of one of the most effective aerial means—the assault aviation.

Success depends here first of all on the extent of aerial reconnaissance. Both the maneuver of enemy units along the front and their arrival from the rear may be disclosed in time only from the air. It is, therefore, very important that aerial reconnaissance be conducted on a round-the-clock basis, even under difficult weather conditions. In addition to the flights of separate reconnaissance planes, each sortie to the enemy's rear should be used for this purpose.

Let us examine briefly the methods of aerial reconnaissance used in our sector of the front. When necessary, each aviation unit is assigned a definite zone in the German dispositions. Thus the movements of enemy troops on the battlefield and those of the operational reserves are constantly observed. In addition to this, all the highways and railroads are kept under systematic observation by special scouts day and night. Whenever a new German group on the march or in bivouac is discovered, they watch it continuously until it has joined the battle. There were cases when our planes had to make up to ten sorties a day to keep an enemy column under observation. Under such a continuous aerial observation the enemy was unable to conceal his movements, and as soon as we noticed a concentration of German troops in a definite area, we attacked it from the air.

In a few cases, when the enemy maneuvered with his reserves in a particularly extensive manner, we assigned reconnaissance missions to Stormoviks [assault planes], bombers, and even fighters. During a recent operation our aviation made more than a hundred sorties a day on reconnaissance missions only. This enabled the senior aviation commander to keep under observation the entire net of roads in the enemy area and to select the most favorable moments for attacks.

Experience shows that in fighting opera-

tional reserves, aerial attacks are most effective when directed against enemy troops loading or unloading at railroad stations. To catch troops doing this is difficult and can be accomplished only by a well organized aerial reconnaissance. Massed aerial blows repeated systematically are the basis of aerial action against enemy reserves.

Once we discovered about fifty German military trains concentrated at two railroad centers located close to each other. It was decided to bottle up this sector of the road. Stormoviks and bombers in considerable force were used in this operation. For three days both centers were subjected to a methodical aerial action. As a result, all the locomotives were put out of commission, several trains were blown up, and bridges and switches were destroyed. All traffic was discontinued for several days. Whenever the Germans tried to restore the railroad, aerial blows were resumed. This went on until our troops captured the area.

The operations of our Stormoviks over country roads proved to be just as effective. There were days when the airmen of one of our aviation units destroyed several hundred cars and trucks a day. Here again reconnaissance played a decisive role. It is important to note that each vehicular column or sector was assigned to a definite aviation unit and that unit was allowed to exercise its own initiative as to the place and time for attack. It happened not infrequently that reconnaissance planes discovered concentrations of German vehicles and called by radio for their main forces which were kept in readiness.

The effectiveness of this method of fighting was demonstrated by the fate of the German tank division mentioned above. This division had been taken from an adjacent sector, dispatched to a threatened sector, and then turned around. The division, as we found out later, had joined the battle so badly mauled that it could hardly be of any help in the situation. And it was so mauled because for several consecutive days our aviation had pursued and pounded its tanks and trains. This example proves that aviation is able to bleed the enemy reserves white long before they join the battle.

We also pay much attention to the action against operational and tactical reserves of the enemy directly on the battlefield and in the vicinity of the front line. In such cases, the mission of cutting off the reserves is assigned mostly to Stormoviks. As a rule, when preparing for an operation, special aviation units are detailed for free search of targets. As soon as our ground troops, after a breakthrough of the defenses of the enemy, drive a wedge into his dispositions, the Stormoviks border our troops from the air. Operating in small groups, they constantly watch the direct approaches to the wedge. In doing so they protect the corridor of the breakthrough and prevent the Germans from deploying their reinforcements. When the Stormoviks discover considerable enemy reserves, of course they immediately call for support.

This method of operations has justified itself during our great offensive battles when the Germans are forced to commit their reserve units.

In addition to their fire action against enemy troops, the Stormoviks are used for transmitting, by radio, information about the regroupment of German units. By doing so they render an inestimable service to our ground troops.

Aviation should be employed to combat the operational reserves of the enemy uninterruptedly. There may be situations which will require the concentration of the main forces of an aviation commander on a single objective. During the period of regroupment of considerable enemy forces, such a measure might prove very advantageous. And, conversely, if the commander under similar conditions operates with a minimum number of planes, it might prove very disadvantageous. Let us repeat, however, that systematic and massed aerial blows will be successful only when combined with a well organized aerial reconnaissance operating on a large scale.

An Advanced Guard Action in New Guinea

From *Aim*, army magazine of the British Middle East Command.

A TYPICAL engagement where minor hostile resistance was encountered in the advance over Kokoda track is described below.

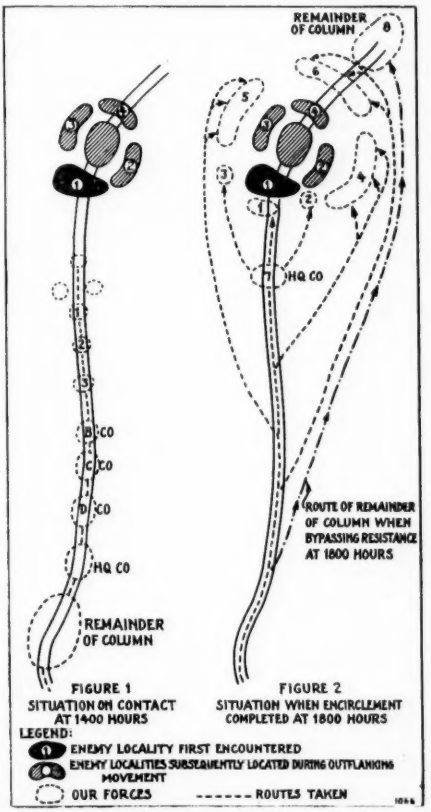
The main column was restricted in its movements to one track through the jungle. One Australian battalion, consisting of four rifle companies, formed the advanced guard. At 1400 hours, contact was gained with troops disposed as shown in Figure 1.

The leading elements of the advanced guard immediately fixed the enemy and attempted to dislodge him. After the deployment of the vanguard, which was unable to dislodge the hostile resistance, an attempt was made to determine the strength, extent, and depth of the position. The advanced guard commander, who was well forward where he could obtain all the available information, after making a rapid appreciation of the situation, ordered a double envelopment according to a prearranged plan as shown in Figure 2.

Two companies were employed on the right flank and one company on the left flank. The two companies were sent round the right flank so that the advance of the main column would be uninterrupted if only minor resistance was encountered.

The units making the encirclement laid telephone lines as they advanced through the jungle. In this manner the advanced guard commander was in constant communication by telephone with all units, and knew all developments in the situation. The encircling forces advanced and encountered only hostile patrols, which were driven in. Based on these reports, which indicated that the enemy position was fixed, the advanced guard commander reported to the column commander the extent of the hostile position. By nightfall the position was completely encircled as shown in Figure 2.

The final attack was ordered at first light the following day. During the night the battalion commander received reports from the company commanders. As a result of constant pressure throughout the night the enemy made no attempt to break through the position. The attack went according to schedule at first light the following day, and



was over within five minutes, except for "mopping up."

The casualties in the battalion acting as an advanced guard resulted in twenty-four men being killed in developing the attack. In the coordinated main attack the following morning only six men were killed. After the battle was over, between 150 and 200 dead Japs were found—a useful credit balance.

In the meantime, based on the prompt, decisive action of the advanced guard commander, the march of the main column was uninterrupted. As a result, the brigade commander, after detailing the new advanced guard, was able to continue the uninterrupted advance with security and bypass this hostile resistance, since he had been informed that the two companies encircling the right flank had fixed the enemy and would protect his left flank in his advance. In addition, he knew exactly the location of the enemy as well as our own troops.

Development of Action

Leading platoon of leading company locates enemy astride the track in hostile area No. 1. Deploys to hold track against enemy action.

Second platoon of leading company deploys to right flank to locate the enemy's flank when it is stopped by fire from hostile areas Nos. 1 and 2.

Third platoon of leading company deploys to left flank to locate the enemy's flank when it is stopped by fire from hostile areas Nos. 1 and 3.

Second company, on arrival, is sent to the right flank by battalion commander to locate and attack the enemy's flank. Stopped by fire from hostile areas Nos. 2 and 4.

Third company, on arrival three minutes later, is sent to the left flank to locate and attack the enemy's flank. Stopped by fire from hostile areas Nos. 3 and 4. Both second and third company lay field cable as they advance.

Fourth company, on arrival, is sent around right flank to block track in rear of enemy. This company, in conjunction with the second company, provides flank and rear security for the force during its uninterrupted advance. This company extends the field cable from the second company as it passes.

Headquarters company is placed in reserve for possible use in the destruction of trapped enemy.

The remainder of the column bypasses encircled enemy position and continues the uninterrupted march. Brigade commander leaves the destruction of the enemy to the one battalion, since the hostile strength and depth was known by this time.

Employment of Assault Wedges in Combat

Translated at the Command and General Staff School from a German article by Lieutenant Colonel Benary, German Army, Retired, in *Hamburger Fremdenblatt* 15 August 1944.

THE battalions and regiments employing the linear tactics of Frederick the Great moved out to battle in accurate alignment, with intervals and distances gauged to the centimeter. With skilfully planned echelonment, they sought, by means of outflanking movements, to inflict a telling blow on one another's flanks or to break through one another's center. Like a chess board with its moving figures, the battlefield lay before the eyes of the general.

Lined up like beads on a string, the rifle troops of the first World War crept from cover to cover. Contact, no matter how loose, was the password in all combat formations. Clean-cut, straight fronts guarding against envelopment were the ideal of infantry tactics of a minor order, of strategic planning. The successive positions were indicated definitely and in detail on operational maps.

The conduct of operations in the present war is of a more arbitrary nature, more revolutionary. The motor on the ground and in the air and automatic weapons with their concentrated power determine its rhythm. The assault wedge is its favorite form of attack. The tank, constituting a mobile source of fire power, is its steel point. The depth to which parallel assault wedges penetrate depends upon the degree of resistance offered by the particular section of the enemy's front.

The attack front does not roll, therefore, in a uniform manner over the open country like the swell of a wind-swept sea, brushing aside slowly but steadily every obstacle, but it breaks its way ahead in a series of plunges like the waters of a spring flood, plowing a deep furrow which is now wide, now narrow. The trace of the front assumes the aspect of a jagged curve displaying projections of varying length. Still more complex becomes the picture when attack is met by attack and thrust by counterthrust, when the enemy also attempts to drive his assault wedges into our front to the right or left of our own. There then arises that zigzag trace of the front that has repeatedly been referred to lately in the official communiqués.

On a small scale, zigzag traces of the front occurred in the positional warfare, in the battles of matériel, during the first World War. On the Somme, in Flanders, we observed a score of times situations where friend and foe had firmly established themselves in the same zigzagging line of trenches. But in the present war we are confronted with new tactical and operational forms on a large scale, with their advantages and disadvantages which must be recognized in their true light and evaluated and employed or compensated for accordingly.

In the case of parallel assault wedges driven deep into the enemy's area, we have the opportunity—by turning the points—of squeezing together the enemy forces between them, of enveloping them and destroying them. These wedges are, however, exposed to the same danger when we are dealing with an enemy who is on the alert in an operational sense and who possesses tactical skill. Projections extending into the enemy's area may become bases for flanking fire by automatic weapons, for assembly areas for the launching of flank thrusts with the aim of rolling up the entire front. But they may also succumb under the concentric fire of the automatic weapons of the enemy ground forces and aviation. The communications lines are difficult to establish and still more difficult to protect in the face of enemy action on a front with a zigzag trace. But, on the other hand, many opportunities are presented to work considerable harm to the enemy in the same area and occasion a material upset in his plans by the employment of bold action.

In all cases, a front with a zigzag trace requires relatively large forces for securing and protecting the jeopardized flanks, and thus these forces are lost so far as employment in the assault wedges is concerned. In close terrain, in the swampy forests and brush of the eastern front, in the rocky terrain and marshland of the south, the command is often able to obtain a clear picture of the situation only after a period of long and difficult air and ground reconnaissance and the careful evaluation of reports. As soon as this has been accomplished, the command will have to decide whether it sees its salvation in a further vigorous advance of the attacking wedge in spite of the hazard resulting from an augmentation of the zigzag trace, or whether it will postpone the advance till a later date and first widen the various breaches in the enemy's front in preparation for a new thrust.

A situation may also develop—and we have seen it lately on the eastern front—in which the zigzag trace of the front has reached a point where an effort must be made to straighten and shorten the front, and at the same time draw back the threatened projections of the front in order to save men and obtain new attack reserves. Whichever of the two adversaries first makes this decision and puts it into execution most logically will gain the greater advantage from it.

All things considered, the conduct of operations on a front with a zigzag trace is not a simple matter. The collaboration of the various attack wedges and the frictionless functioning of their supply services place great demands on the command and signal systems employed in the conduct of operations. The dependable German command posts and signal corps have shown themselves equal to the situation, however, and have proved that even in the most difficult of situations they have no trouble in finding a way out that will be favorable to their own plans.

XUM

Dieppe and Cherbourg

Digested at the Command and General Staff School from an article in *The Times*, London, 4 and 5 August 1944.

Plan and Execution of the Raid

THE Dieppe operation of 19 August 1942 may be regarded from two points of view. In the first place it was an attempt to harass the enemy and inflict damage upon military installations, and one of a series of raids carried out with that object.

To a much greater extent the raid on Dieppe was a trial, and the most important of its kind. This was the only raid involving the landing of a large body of troops on a strongly defended coast, a coast which was to be invaded as soon as the necessary strength and appliances could be assembled. It was essential to obtain data to work upon for the development of all these appliances. It was no less important to reconnoiter more closely than was possible from the air alone the nature of the defenses and to observe the enemy's reaction.

The plan comprised four preliminary landings at dawn (see sketch): by the Commandos on the flanks at Berneval (Yellow Beach) and Varengeville (Orange Beach), and by Canadian troops at Puits (Blue Beach) and Pourville (Green Beach). This was to be followed by a frontal assault on Dieppe itself (Red and White Beaches) half an hour later. The task of the Commandos was to silence heavy batteries above Yellow and Orange Beaches. On the inner eastern flank at Blue Beach the Royal Regiment of Canada was to clear the big headland overlooking the Dieppe beaches. On the inner western flank at Green Beach the South Saskatchewan Regiment was to occupy the even bigger headland above Pourville; later on, the Cameron Highlanders of Canada would land on this beach and advance inland to capture the airdrome of St. Aubin. The main attack on the Dieppe beaches was the task of the Essex Scottish on Red Beach and the Royal Hamilton Light Infantry on White Beach. The first wave of tanks was to land simultaneously with the infantry and, it was hoped, push through the town with the aid of parties of engineers and cooperate with the Camerons against the airdromes.

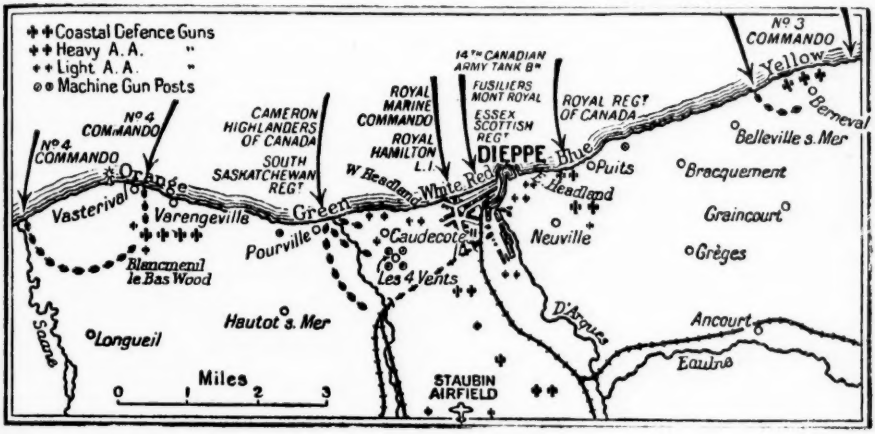
Approximately an hour before the time fixed for the first landings there occurred the incident so well remembered, the encounter of the landing craft of No. 3 Commando with a small hostile convoy. In the short-range action which followed, the landing craft scattered. The enemy was prematurely alarmed, and a good deal of loss occurred. Nevertheless, a handful of men from the Commando, sniping and giving an impression that it amounted to many times its real strength, drew the enemy's fire from the targets on the main beaches. The Orange Beach attack of No. 4 Commando was a complete success. The Varengeville battery was carried; the guns were destroyed; and the whole of the German detachment killed or taken prisoner.

The Canadian attacks on the inner flanks were not successful. That on Green Beach went off the better of the two. There was no opposition till the landing took place, though fire was afterwards hot. Pourville was entered, and progress made up the high ground towards Dieppe. In spite of the greatest heroism, however, the trench system round Les Quatre Vents Farm could not be carried. The Camerons, following up the South Saskatchewans, nevertheless advanced two miles inland up the Scie, but there was no sign of the tank support, and the battalion was recalled. Blue Beach was a disastrous affair. The convoy attack had put the enemy at Puits on the alert, and the touchdown was late. Only one small party succeeded in getting off the beach. The failure to clear the headland involved heavy losses from the artillery installed upon it for the troops attacking the Dieppe beaches.

It is impossible to describe in detail the events on these beaches. The first touchdown was only a little late, but the tank-landing

craft were delayed fifteen minutes, so that there was a gap in time between the cessation of the bombardment and their arrival. Intense fire was directed on the beaches from the castle, the casino, and the west cliff. The casino was captured after fighting from room to room. This enabled parties of the Royal Hamilton Light Infantry to enter the town. Ramps could not be built for the Churchill tanks to cross the sea wall, owing to the heavy fire, but a number—the latest information suggests fifteen—did get over by means of special palings. They were, however, prevented from entering the streets of Dieppe by the blocks, which could not be demolished. The floating reserve, the Fusiliers Mont-Royal, with the Marines as a second wave, was ordered to land, the decision being apparently based in part on a mutilated message that the Essex Scottish had entered Dieppe, whereas, in fact, only about a dozen men got through. The reinforcement could do no good and suffered very heavy loss, which would have been greater still had not the Marine Commando's disembarkation been in part countermanded by its commanding officer.

The order for withdrawal was issued at 11:00 AM. Most of the tank crews remained in their tanks to cover it by their fire. The destroyers also stood in so closely to protect the re-embarkation that one of them was actually grounded by the stern as she turned away. The air cover was brilliantly successful. German bombers did not put in an appearance for some five hours, and were then roughly handled. It was estimated, that, in all, 170 hostile aircraft were destroyed.



Influence on Subsequent Operations

While the profits of the Dieppe raid are at first sight debatable, the losses are only too manifest. The Canadian casualties alone numbered 3,371, and this without any of the demolitions projected having been carried out. Yet when the asset side is examined it will be found to amount to an invaluable total. Dieppe proved to be the source from which almost every lesson affecting future operations, and especially the landing in lower Normandy, was derived.

The first and most important lesson was the need for overwhelming fire support, including close support during the initial stages. This would have to comprise support from the air, heavy and medium naval support, and support by special vessels working close inshore. It was the experience of Dieppe which led to the creation of the support craft now in use, just as it was that experience which brought battleships and cruisers into the Bay of the Seine in June 1944.

A corollary to this lesson was that it might be necessary to abandon the ideal of complete tactical surprise. Against defenses organized as were those of the west coast of France it was seen to be more important to pulverize the resistance in advance than to catch sections of the garrison asleep, especially since there existed no certainty that this could be accomplished in any case.

The need for a combined headquarters was no less clearly indicated. The outline plan of every form of combined operation must be prepared by an experienced interservice staff. This has now become a commonplace, but it was not so then. Again, while a combined operation needs even more meticulous planning than any other, in none is flexibility more necessary. The well-known military axiom, that the place to which it pays least well to send reinforcements is the place where there has been a failure, applies even more strongly to an opposed landing than to normal warfare. This points to the widest possible front and to a number of landing places, because with a cramped front and few landing places the commander can do little to impart flexibility. It points also to the necessity for retaining a substantial reserve, since forces once committed lose their flexibility; in fact the initial landing force must be the minimum which can do the job.

Dieppe furnishes one more argument against the frontal attack when avoidable. When the Canadians set out to take Dieppe in 1942, they landed at Dieppe. When General Montgomery's army group set out to take Cherbourg in 1944, it landed some fifteen miles away.

It was shown that the most advanced of the enemy's antitank defenses must be destroyed before tanks were landed; otherwise it was probable that they would either be stuck on the beaches under fire or stopped by obstacles soon after leaving them, as happened at Dieppe.

One of the most significant of all the pointers was in the direction of airborne troops. As a fact, the conditions suitable both for landing craft and airborne troops did not occur throughout the whole period within which the operation was scheduled to take place; the conditions as regards light and tide were favorable for ships and landing craft, but they would not have permitted the employment of airborne troops at the required time. But technique and equipment were improving, and before two years had passed methods which were then considered hazardous had become readily practicable. That being so, the use of airborne troops prior to the landing and even to the preliminary bombardment would restore the element of surprise to a large extent. Their immense value in "jumping" obstacles was too patent for further emphasis upon the subject to be needed.

The use of smoke at Dieppe brought up a number of topics for discussion. In general it was considered that the smoke made by ships, aircraft, and land forces was extremely useful but inadequate in quantity. When employed to cover the withdrawal it was not developed quickly enough. At Dieppe the approach of the landing craft could not be screened by smoke because the cannon-fighters were required to go in and attack just before the craft touched down, and if smoke had been laid by aircraft at this stage the bombarding ships would have lost sight of their targets. Here the deduction was that action by fighter aircraft, if considered necessary, must precede the use of smoke to cover craft approaching landing places. It was also decided that, for a daylight assault, full use must be made of smoke when occasions demanded it, particularly to cover ships or craft required to remain comparatively close to the shore, and that specially fitted craft should be provided for this purpose.

Among other lessons learned was the need for a great improvement in aircraft recognition by naval and land forces, this having been far from good at Dieppe. Many useful hints as to the means for providing for security emerged from the discussions. Attention was concentrated upon combining this vital necessity with the no less urgent need for

preliminary "briefing" of the forces engaged. Without the latter, officers and men could not be expected to know enough of the intentions of their superiors to enable them to take advantage of a favorable situation or minimize the effects of a setback. Though there had been two rehearsals for the Dieppe raid, fresh emphasis was put upon their necessity. It was considered that special training would be required for all engaged in tasks such as night operations, street fighting, and attacks upon concrete casemates.

The raid exercised a profound influence upon the Admiralty as regards both production and tactics in combined operations; upon the War Office with special reference to engineering; upon the Air Ministry with special reference to close support.

In the personal message from Lieutenant General H. D. G. Crerar to his troops on the eve of the invasion [of Normandy] there occurs this passage: "The plans, the preparations, the methods, and the technique which will be employed are based on knowledge and experience bought and paid for by the 2d Canadian Division at Dieppe. The contribution of that hazardous operation cannot be overestimated. It will prove to have been the essential prelude to our forthcoming and final success." These words were fully warranted and provide the most complete justification for the raid on Dieppe.

Artillery Support of Attacking Tanks

Translated at the Command and General Staff School, Fort Leavenworth, Kansas, from a Russian article by Lieutenant Colonel P. Kolomeytsev, Soviet Army, in *Krasnaya Zvezda* (Red Star) 4 August 1943.

THE armament of modern tanks is sufficiently powerful. It enables them to accomplish their missions independently. Nevertheless, tanks need the support of other ground fire elements, primarily artillery. This is quite obvious if one takes into account the character of modern defense and the means with which the enemy opposes the attacking tanks. The conclusion cannot be drawn from this that tanks are not able under any circumstances to clear their way with their own fire, but if the enemy has succeeded in organizing his antitank fire, then the tank attack must definitely be preceded by a preliminary fire preparation by all the available artillery elements, organic as well as attached.

In attacking a strongly fortified position, tanks depend on the general fire plan of the artillery; that is, their attack will be coordinated with artillery fire and air attacks. It is essential that the artillery support of tank attacks be powerful and calculated to cover the whole depth of the tank attack. To attain this, both the long range of the artillery and its close support should be utilized.

The opinion exists that long-range artillery fire is inaccurate and for this reason of little use for maneuvering tanks. Of course, firing at its limit, artillery cannot hit every enemy gun opening fire on tanks. This the tanks themselves and the accompanying artillery can do successfully. But long-range artillery is effective enough when its fires are massed. The mistake of some tank people consists in losing sight of this side of the matter.

When in the depth of the enemy defense, some kilometers from the firing positions of the main mass of artillery which is still in its former positions, the tanks often dissipate the efforts of the artillery by sending in requests for fire on numerous unimportant targets encountered en route. Striving to fulfil these requests, the artillery decentralizes its fire and does not achieve any tangible results. The false impression is created that the artillery is unable to support the tanks by long-range fire. Actually, such a support is effective if it is a powerful, massed artillery fire, directed at the centers of enemy resistance in the zone of the tank attack. In practice there were cases when

artillery, concentrating its fire on various objectives or positions, gave great aid to tanks in firing at eight to ten kilometers without changing position.

The farther from the forward edge, the more the defense takes on an insular [isolated] nature. This means that there will not be so many objectives for artillery fire. Hence, target indication, that is, the request by tanks for concentrated artillery fire as soon as needed in the course of the battle, is facilitated. It seems to us that when the action has developed in the depth of the hostile defense, the right of request for long-range artillery fire must be left to commanders of tank units not lower than brigade or battalion (if tanks are dispersed along the front). This prevents dissipation of the fire of the entire artillery, and permits the coordination of its fire for the most important objectives.

Discovering a new center of resistance in the rear of hostile defense, the commander of a tank unit must not take chances, risking the loss of all his vehicles. It is more sensible first to fire on the enemy and thus prepare him for the tank attack. That is what is usually done when the forward edge is to be stormed. The very same thing can and must be done in the enemy rear, always preceding the tank attack by a powerful fire on the objective, for which not only accompanying guns but also numerous batteries conducting fire from their main concealed positions are used.

A certain pause is necessary to organize all this. Without moving his tanks into the zone of effective fire of the new strongpoint, the commander of the tank unit determines its boundaries (at least along the front) and requests fire by his artillery, giving it a definite mission. After studying the mission received from the tank commander, the artillery subjects the indicated area to an intensive shelling. Experience has shown that such joint blows of tanks and artillery, strictly coordinated as to place and time, constitute the most acceptable and effective form of cooperation. They permit the full use of the long range and fire power of the entire artillery for supporting the maneuver of the tanks in considerable depth.

We are not concerned here with the details of the organization of artillery observation. It is clear that it must be as close as possible to the battle formations of the tanks. Artillerymen must give support to tanks on their own initiative, on the basis of observation of the actions of the tanks. But tank crews should know that it is not so easy to grasp the meaning of a tank maneuver. The observer does not always succeed in understanding at once why, for instance, tanks stop or turn to one side. By the time he figures out where to direct fire, the chance is lost. Artillery support on its own initiative is absolutely necessary, but nonetheless, when it is a matter of supporting tanks in the attack, the main stress must be on target designation by tank personnel, especially when concentrated fire is requested. It is better, of course, if this is done by an artilleryman accompanying the commander of the tank unit.

Thus the fundamental principles of artillery support of the tank attack are as follows: full use of range of artillery with sufficient massing of its fire; no hunting for separate targets; no dispersal of fire, but powerful concentration on objectives which the tanks are to attack. The main task of the artillery is not to guard tanks from adversities on the battlefield, but to execute combat missions jointly with them.

Fire support does not exhaust the problems of artillery support of the tank attack. It is important in modern warfare to provide the combat formations of attacking infantry and tanks with all types of close support artillery. This is an old problem, and only now it seems to have been solved. As is well known, attempts to drag guns behind the tanks, within the battle formations of tanks, were not successful, since both the trucks, or tractors, and the crew of the gun were destroyed by hostile fire. Nothing important resulted, either, from the towing of guns by the tanks themselves. As a rule, the tank towing the gun across broken terrain smashed it, and only the barrel of the gun was left. The necessity for all these attempts ceased with the appearance

of self-propelled armored guns. Now our tank units are sufficiently provided with them. These guns played an important role in stopping the German advance on Kursk. There they were used mainly for fighting heavy tanks.

In the attack, self-propelled guns are used to fill the space between artillery and tanks. Thanks to reliable armor protection, they can constantly accompany the tanks, securing their movement by the power of their fire. Let us see how this is accomplished in various stages of the attack.

The question of whether the self-propelled artillery should be used for firing on the forward edge of hostile defense depends upon the situation. If it is a tank attack in a sector where there are enough other artillery elements, then it is best to save the self-propelled artillery for the main mission, i.e., close support of tanks through the whole depth of the attack. One more question: is it necessary to move self-propelled guns to the forward edge for firing point-blank on the remaining firing positions at the moment when the artillery transfers its fire into the depth and the general attack is about to begin? The answer is that this is not necessary if the combat formations of the infantry contain many antitank and other guns designated and ready for direct firing at targets on the forward edge.

Thus, in the cases cited above, that is, when the attack is supported by numerous artillery of all types, self-propelled guns may be disposed in the departure positions of the tanks and begin the attack with them. Another variation is also possible. Before the start of the tank attack the self-propelled guns move forward. Upon reaching the infantry lines they stop (preferably in concealed places) and open fire on targets on the forward edge, thus supporting the attack of the tanks. The tanks should pass these guns when the latter have fired four or six rounds. Following this, the self-propelled guns move behind, firing through the gaps between the tanks.

On the basis of experience, let us try to determine where the guns accompanying the tanks should be. In attacking the forward edge and the zone immediately beyond it, the self-propelled guns should be spread along the entire front of the tank attack in a formation similar to that of the tank units (in a line). This is essential because the strength of defense of the forward edge will be uniform along the entire front of the attack. This means that the attacking tanks should be supported everywhere by the fire of all available means. Self-propelled guns, proceeding in pairs in the second echelon, halt once in a while and open fire on the various enemy firing positions.

With the advance into the depth of the defense, enemy resistance in separate areas will increase. The tanks will encounter new and still untouched centers of resistance. Besides, the enemy will try to counterattack. Flexible maneuver and rapid concentration of their efforts in decisive directions are now required of the tanks. This can be done best with the aid of self-propelled artillery.

During fighting in depth, the accompanying artillery should not be dispersed. It is better if it is placed under the commander of the tank unit and is used for blows on main targets in a concentrated manner. When a new strongpoint is encountered, the commander of the tank unit, in addition to long-range artillery support (mentioned at the start of the article), uses all the fire power of the self-propelled guns to crush decisively the resistance of the enemy and thus assure the success of the tank attack. Concentrating its fire on a definite objective, the self-propelled artillery should not engage in protracted combat. It should fight the enemy with short but intensive blows, the effect of which should be immediately exploited by the tanks. The fire of the self-propelled guns does not substitute for the fire of the tanks but only strengthens it. Therefore, the fires of the tanks and of the guns, as well as their maneuver, must be strictly coordinated.

When anticipating counterattacks by enemy tanks, the self-propelled guns should be concentrated closer to the endangered sector and some of them left in reserve (together with some tanks). When the enemy tanks appear, the self-propelled guns open fire from stationary positions (from concealment) on

the heavy tanks and on self-propelled guns as soon as they come within effective range. Medium and light tanks of the enemy will be taken care of by the tanks.

Exceeding it in fire power, the self-propelled gun possesses almost the same qualities as the tank. Therefore, similarly to the tanks, the tactics of self-propelled guns are based on flexible maneuver coordinated with fire. The self-propelled guns approach the target in a concealed manner, crush it with their fire power and then move away quickly in order to destroy another enemy target from a new position. By their very essence, self-propelled guns constitute assault artillery. Their whole action is to attack by their fire. Therefore, the maneuver of individual guns and units of self-propelled artillery must be distinguished by dash and boldness. Combat experience provides examples when self-propelled guns had to break into the midst of the enemy infantry, destroying it by their fire and crushing it under their caterpillars. Sometimes this is necessary. The tank commander, however, should relieve the self-propelled artillery of such missions and utilize its fundamental quality—the great power of its fire.

Communication between the self-propelled artillery and the tanks is accomplished primarily by radio, as well as by visual signals. In many instances the commander of the self-propelled artillery will be able to ride alongside the commander of the tank unit and, receiving assignments from the latter, will communicate them by radio to his units.

Therefore, the uninterrupted artillery support of tanks in offensive action is accomplished by flexible fire maneuver of the entire artillery, and by the use of self-propelled guns in the combat formations of the tanks. The greater the number of such guns moving along with the tanks and the infantry, the more powerful will be their joint blows, and the stronger will be their resistance to enemy counterattacks.

Organization and Task of a Beach Group

From *The Fighting Forces* (Great Britain) August 1944.

A BEACH group is a formation with a dual role: first, it has the responsibility of landing personnel and also the vehicles and equipment of the fighting troops and setting them on their way inland. Secondly, it receives the stores required for the maintenance of the force from ships and moves them across the beaches to dumps inland, arranging them to be ready for issue.

The way in which these vital tasks are carried out has a direct effect on the success of operations. It must not be forgotten that the beach group is likely to be called on to tackle its arduous and complex work in the most difficult conditions and in the face of formidable opposition.

The beach group lands with the various waves of the assault troops and at once confirms on the ground the plan for the layout of the area already made on paper. Units and subunits set to work to clear mines from their areas.

An inspection of the duties of the subunits of the formation, which includes elements of the Royal Navy and the Royal Air Force, reveals in detail the duties of the organization.

The Royal Naval element is divided into RN Signals and RN Commandos. The former maintain communication from shore to ship and from shore to home bases, while the latter are responsible for the movement of craft up to the time of beaching. They select the points of landing and set up navigational aids for day and night.

The Royal Air Force also has two functions. It supplies specialist officers spread among the subunits of the beach group, who ensure that the requirements of the RAF units and airfields are not overlooked. RAF personnel are found on the beaches and in the ammunition and petrol dumps. Secondly,

it falls to the RAF to supply balloons for cover over the beaches and dump areas.

The most important portion of the beach group is the infantry battalion. The headquarters infantry battalion is the headquarters of the beach group. A staff captain is attached to this headquarters to assist in dealing with the other seventeen subunits which must be coordinated into an integral formation. The infantry battalion has two tasks. It is responsible for the movement of stores, vehicles, and equipment. Two of its companies supply general labor on the beaches, unloading craft of various types, assisting with casualties, and placing their area in a state of defense. A third company is allotted for labor in the ammunition stores depot, while the fourth—constantly in demand—is held for allotment to any of the specialist sections of the beach group needing assistance. The battalion's second task is the local defense of the maintenance area and, as the beach group is likely to be the target of strong enemy reaction, this is a job which calls for first-class fighting soldiers.

The Royal Engineers supply three elements to the beach group. First is a field company whose main task is the construction and maintenance of roads and tracks, the repair of damaged bridges or culverts, as well as work on unexploded bombs and mines with which other arms cannot deal. The field company also arranges the water supply in collaboration with the Royal Army Medical Corps. Attached to this unit is a stores section army, with the heavy task of manning the RE [Royal Engineers] dump. Half a mechanical equipment section is allotted to the beach group with the task of operating cranes and bulldozers. A port operating company RE has the onerous task of unloading stores from coasters and ships on to craft.

A large signals unit works at the headquarters of the beach sub-area to maintain communications with headquarters beach group through headquarters beach sub-area with the headquarters of assault formations. A beach signals section comes ashore early, equipped with a number of wireless sets at the disposal of assault formation commanders.

The Royal Army Service Corps supplies a general transport company which operates DUKW's, those valuable amphibious lorries used for transporting men and stores from craft to shore. This company also operates a number of three-ton lorries for the transport of stores from beaches to dumps. Two small but important units supplied by the Royal Army Service Corps are the detail issue depot, from which is distributed food and water, and the petrol depot.

The Royal Army Medical Corps is represented in the beach group by two field dressing stations, two field surgical units, two field transfusion units, and a detachment of a field hygiene section. Each field dressing station forms a B.D.S. near each beach, where the wounded in that area may receive immediate attention. This subunit is also used as a casualty evacuation center, from which the wounded are transported to the home base.

The issue of ammunition and weapons is the responsibility of the Royal Army Ordnance Corps' ordnance beach detachment, a most important unit occupying a dump of a considerable area. This corps is also responsible for the collection and distribution of clothing and ordnance stores.

In the congested area, where the coordinated movement of motor transport and the swift despatch of stores is essential to the successful development of operations, traffic control is a task of vital importance. A headquarters and four provost sections undertake this task, and also help to shepherd men who arrive on the beaches, especially at night, into the correct channels, and thence to their units.

A beach recovery section of Royal Electrical and Mechanical Engineers is another unit of the beach group. It has the task of recovery and repair or reconditioning of disabled and especially of "drowned" vehicles.

Finally, the Pioneers are represented in the beach group with a company which supplies labor in addition to that given by the

infantry battalion. Generally, part of the company is detailed to make roads under the direction of the field company, Royal Engineers.

The period during which the organization has to carry out its task action is of course determined by the success of the assault and the speed with which a workable port is captured. It is anticipated that beach groups may be called upon for the work outlined above for a period of many days, during which continuous and arduous operations have to be carried out.

The beach group is a newcomer in the tactical scheme. It was evolved after two years of war and first used in action in the Sicilian landings. At that time the organization of the beach group was much less complex than it is today, but the principle and potentialities of the system were demonstrated, and the successful work done by these formations for several weeks after the initial landings was recognized.

It should be clearly recognized that a large proportion of the subunits comprising the beach group are combatant units. The units selected for participating in this work during the present operations have specially qualified for their arduous and onerous duty by their high standard of fighting efficiency.

"Combined Marches" in Regrouping Operations

Translated at the Command and General Staff School from a Russian article by Captain V. Zeidner in *Voyennii Vestnik* (Military Journal) September 1943.

THE regrouping of troops when the enemy has driven a wedge into our defense represents one of the most difficult problems of the tactical art. The battles for Orel confirm the fact that, when only limited means of transportation are available, the best method of moving units is the combined movement [Russian term for combined shuttling and marching.—Editor].

In one of the sectors of the central front, the Germans had concentrated large infantry and tank forces, and managed to drive a wedge into the main zone of our defenses, threatening thereby the left flank of our unit.

The enemy encountered stubborn resistance, and committed part of his reserves with tanks. He intended to seize Nikolayevka*—an all-important center of communication in the rear of our troops. By that time, our reserves had been moved to the center of the breakthrough area and had been committed to action; but in order to parry the threat to Nikolayevka, it was also urgently necessary to move here a rifle division from another sector.

The division to be moved was located (evening of 6 July 1943) in the second echelon of the army defensive zone. This unit had to march from Ivanovka to Alekseyevo and Victorovo, where trucks were being assembled, and then to proceed in two motor columns along the routes Shurino—Sergeyevskoye—Nikolayevka, and Mikhailovo—Nikolayevka. The length of the route was 150 kilometers, twenty of which were to be covered on foot. The division was to arrive at its destination in the afternoon of 8 July.

The selection of this method of moving the troops, and of the entrucking areas located at a great distance from the starting point, was made for the following purposes:

1. To use effectively the time during which the trucks were released and brought up for the first trip. During this time (seven to eight hours) the troops could get ready for the march and reach the designated entrucking areas.

2. To make maximum use of the night for the concealed movement of troops in order to disorient the enemy's aerial reconnaissance as to the location of the second echelon of the army defensive zone.

Motor transportation units based at a considerable distance (eighty to ninety kilometers) from the entrucking areas were used

*All names are fictitious.

for moving the division. Moreover, the vehicles had first to be released, inasmuch as they were used at that time for the transportation of supplies. It proved to be impossible to provide in a short time a sufficient number of trucks for the simultaneous transportation of an infantry division. It was, therefore, decided to use trucks only for the combatants and for seventy percent of the matériel and the combat trains. All horses, part of the horse-drawn artillery, field kitchens, and the rest of the trains were to cover the whole distance by marching.

This required 500 trucks. At 2200 hours on 6 July the division started out, and arrived at Alekseyevo and Victorovo at 0600 hours on 7 July.

To accelerate the release of the trucks and the organization of the movement, a special operational group was set up by the army staff. Thanks to the initiative and energy of the officers of this group, more than 200 trucks were diverted for this movement and dispatched to the entrucking areas of the division on the night of 6-7 July. They began arriving at 0700 hours on 7 July. The rest of the vehicles were coming uninterruptedly in groups of twenty to thirty trucks, which made it possible to entruck two infantry regiments, an artillery regiment, and special units before noon of 7 July.

The third infantry regiment continued its march for twelve more kilometers, to Shurino, where it made a long halt in the evening of 7 July. Here it was entrucked on the night of 8 July as the unloaded trucks were returned to this point. At 1400 hours on 8 July the entire division was assembled in the vicinity of Petrovka.

During 7 July, the enemy, continuing to increase his blows in the center of the breakthrough sector, began attacking along the highway leading to Nikolayevka, and committed his main reserve (one infantry and two tank divisions). As a result, he succeeded in advancing from two to four kilometers through our defense. Violent battles with enemy tanks and infantry continued throughout 8 July.

To cover Fedorovka, one more division had to be brought up. This division was located near Pavlovo, and was also a part of the second echelon of the army defensive zone. The time allotted for the moving was still more limited (twenty-four hours), and the distance to be covered was about eighty kilometers. The distinctive feature of this operation was the necessity of transporting simultaneously considerable stocks of ammunition and food.

When the order was received, the division was alerted and at 2100 hours on 8 July started for the entrucking area (in the vicinity of Andreyevka).

Because of the particularly urgent character of this operation, many more motor vehicles were required than in the first case. On the evening of 8 July more than 300 trucks were on the roads between Shurino and Nikolayevka, transporting the last groups of the first division. Therefore, 250 additional trucks were detailed. The instructions (number of trucks required, loading capacity of each truck, etc.) were sent to the operational group. Simultaneously, the order for the movement was delivered to the staff of the unit to be transported. This enabled the operational group to send to Vasilyevo and Maryino special control posts composed of three or four men with noncommissioned officers in charge of each group. These posts intercepted the trucks returning to their stations, and directed them along the new route. Fuel trucks for refueling of the motor vehicles engaged in the new mission were also brought here.

At 0130 on 9 July the marching column of the main body of the division arrived at Grigoriyevka. By that time about one hundred trucks were concentrated in the vicinity of Andreyevka, where a control post of the operational group had been established. Here were also assembled the representatives of the staffs of the units to be transported and of the higher staff in charge of the transportation. More than 300 trucks were already approaching Sidorovka.

The staff officers and the officers of the operational group made the following decision: to start entrucking at Grigoriyevka without losing time, and to continue it subsequently as the infantry and trucks were arriving. This was done in order not to interrupt the movement of the columns marching along the route.

The first and part of the second regiment of the division, the artillery regiment, and the special units entrucked at 0215. At 0500, two battalions of the third regiment were loaded. The third battalion continued its march up to a road junction near Sidorovka, where it entrucked at 0900 on 9 July. Thus, the division marched some twenty-five kilometers of the total distance.

The 250 trucks which came from Semyonovka picked up, in addition to troops, ammunition from the artillery depot and other military supplies.

At 1200 hours on 9 July, at the exact time specified in the order, the entire division was concentrated in the vicinity of Fedorovka with sufficient ammunition and food for the completion of the assigned missions.

The movement of the second division was also carried out with a limited number of trucks, but the representatives of the staff in charge of the transportation and the operational group, having taken into account the experience of the preceding movement, employed the transportation units in a more efficient manner. This expedited the movement considerably. The self-propelled howitzer artillery and the antitank unit proceeded to the new area independently. The gun batteries of the artillery regiment and the 76-mm regimental guns were towed by the trucks. The cargos of the regimental train in the sector Andreyevka-Sidorovka were loaded on trucks, which increased considerably the speed of the traffic.

The above troop movements show that, under the conditions of limited time, restricted transportation facilities, and lack of a special transportation reserve, the technique of motor transportation differs from that used in transporting troops in rear areas at a considerable distance from the front line and when ample transportation equipment is available.

The entrucking of troops is carried out at several battalion entrucking areas, such as populated places and other points offering concealment and situated along the main road. Since the trucks arrive in groups of fifteen to twenty, it is most expedient to effect the transportation by small units such, for example, as a rifle company.

In order to expedite the maneuver, the loading is done while the troops are marching. This results in a certain gain of time and insures the dispersion of troops on the march. Beyond the entrucking areas, the marching columns may use parallel roads.

The loading of the units into the trucks was carried out in small populated places. The observance of strict camouflage discipline (locating units in gardens and sheds) and of strict order during the loading, which excludes all aimless loitering on the road or in its vicinity, insures sufficient concealment for daytime entrucking.

In the movement of the second division, units marching at the head of the column were picked up right from their march formations. This method proved to be fully justified in practice. The speed of the entrucking and of the departure of the trucks was supervised not only by the commanders of the transportation units, but also by specially detailed officers of transported units and of the higher staff.

This system secures the so-called "pulsating flow" of trucks, which even in the daytime and in open terrain complicates enemy visual and aerial photographic reconnaissance. The same method permits of sufficient intervals between the trucks (from 150 to 300 meters) and between truck groups (from four to five kilometers). The speed of the movement varied from twenty to thirty kilometers an hour.

A characteristic feature of the movement was the return of empty trucks by the same route. This was dictated by the necessity for the quick return of the empties, since the use of other (poor) roads would undoubtedly have delayed the completion of the maneuver.

Of course, the above described method complicated the work of the traffic-control agencies, created additional traffic, and attracted some attention from enemy aerial reconnaissance. At the same time, however, the German aerial reconnaissance was disoriented to a certain extent. Since most of the trucks had tarpaulin covers, the Germans could not figure out the direction of the movement of loaded and empty trucks. This was largely accountable for the fact that the enemy, though notified by his aerial reconnaissance about the presence of small truck columns traveling both ways, did not attach any importance to it, did not increase his aerial reconnaissance in the direction of the area of concentration, and did not direct his bomber aviation, which was then operating on the adjacent sectors of the front, toward the route of the trucks.

The transportation of troops in several echelons in the "pulsating flow" requires an extremely precise organization of the control stations. During the movements described above, the control service was well organized; no accumulation of trucks on the road and no bottlenecks in narrow places were observed. The number of posts on the principal roads was increased. Additional posts and road markers were posted in the entrucking areas, at road junctions, and in the vicinity of roads leading to the detrucking areas. The control men paid particular attention to the speeding up of the traffic whenever truck groups fell behind, since the commanders of the units, when one truck was stopped, halted the entire group until the damaged truck had been repaired.

Active antiaircraft defense depended on the organic antiaircraft means of the transported units. The most dangerous sectors of the itinerary were covered at night. The entrucking areas and the separate columns on the move were protected by the fire means of the rifle units (machine guns, antitank rifles). The detrucking areas were protected by fighter aviation.

The exceptionally urgent character of the combined movement required the organization of reliable communication to secure precise control of the trucks and uninterrupted information about the development of the maneu-

ver. Since there was little time for preparation, communication was primarily by radio and by mobile means. In the entrucking areas, telephone instruments were installed and connected with an army line passing near by. Staff officers of the transported units reported by radio the crossing of previously designated points. Liaison officers who arrived at the beginning of the movement supplied unit staffs with maps and other information concerning the regrouping operations. This enabled the commanders to contact immediately the higher headquarters which assumed the command of these units. Radio dispatches relative to the development of the maneuver were duplicated by reports carried by officers on light cars and motorcycles.

The tempo of the movement was pretty strenuous. Had the troops covered the whole route by marching, it would have required four days for the first division and two days (forced march on the basis of twelve hours of marching a day) for the second division. The combined movement of the first division was completed within thirty-six hours, and that of the second, within twelve hours (including the assembling of the combat elements and of the matériel necessary for the accomplishment of the combat missions). Thus, the time gained was thirty-six and sixty hours for the two movements, a fact which, in view of the shortage of transportation facilities (only thirty-five to forty percent of the required number of vehicles were available) proves the efficiency of this method of moving troops.

The Swiss Army

Translated and digested at the Command and General Staff School from a German article by Hans Georg Pauls in *Deutsche Allgemeine Zeitung* 23 July 1944.

POSSIBLY in no other country of Europe has military consciousness gained so much practical importance within one generation as in Switzerland. Swiss militia could claim even before the first World War a skill in shooting which was beyond the average. But the military national defense organization on which the Confederacy can rely in the fifth year of the second World War has hardly anything in common with its predecessor.

It is rather difficult to give an opinion about the value of an army before it has given the last and only conclusive proof. Still, there are numerous clues and possibilities for judgment which allow one to draw conclusions even during the state of preparation. It can be said without too much reservation that the theoretical fighting strength of the Swiss troops satisfies all requirements.

Though the character of a militia has been preserved according to the letter in the different branches of the army, the present structure of the army differs very little from the standing armies of other countries. The training period of the recruits has been extended several times, and is now from three to five months. In peace time it is followed by annual refresher courses which last up to two and three months. In the officers corps there is a distinction between the relatively small staff of training officers (*Instruktionsoffiziere*) of all ranks, and the commanders of units (*Einheitskommandanten*). As contrasted with the instructors, who as "technicians" are charged with the training of the recruits, both the commanders of units and the army men are civilians who interrupt their private professions only temporarily in order to perform their military duty.

The organization of the Swiss Army had been changed largely before the outbreak of the war by the army reform of 1937. The aim was greater mobility and specialization. In addition to a newly organized special frontier troop and the improvements in active and passive antiaircraft defense, the army reform stressed mechanization and motorization, and a fuller equipment of the infantry with medium and heavy weapons. It is natural that the army reform of 1937 has been far

surpassed in the meantime, after the experiences of the war have necessitated many new decisions concerning organization, armament, and tactics, about which the public has not been informed in detail. The strongest influence upon the present thinking has been the "fortress idea" (*réduit-Gedanke*), which materialized in May 1940. It is based on the assumption that a small army has a prospect of a successful defense only when it fights a delaying action in the forefield and then defends to the last the core of the country, which is the natural fortress formed by the walls of the Alps.

Important changes in the structure of units became necessary because of this "fortress idea." A relatively small army (it is based on a population of only 4.2 millions) was to be established which should be able to resist an opponent superior in numbers and in armament. This was also reflected in the reorganization of the principles of training and command. Large units of a considerable shock force were transformed into very small units, but strongly armed and with versatile training. Training in combat tactics had to be shifted to the lower ranks, down to the individual soldier, and had to stress more prominently than before individual combat ability and soldier-like thinking.

The grenadiers are a new arm of the service which was started only in 1943 on the basis of the experiences gained on the battlefronts of Europe. The German mountain troops and pioneers, as well as the paratroops, may have contributed some ideas to the extension of tasks of this arm in regard to adaptability to the specific personal and material conditions of Switzerland. It is intended to use the Swiss grenadier, with his close-combat weapons, for breaking the opposition or for opening the way for the infantry under difficult combat conditions; for example, in villages, against fortified positions, and against enemy tanks and other heavy weapons.

It has evidently been planned that the grenadier battalions are to become an elite arm with specific tasks. While at the start, suitable men were selected from units of different arms of the service and were then trained as grenadiers, since 1943 special courses of three months have been added to the normal recruit school. Since the beginning of 1944, there have been grenadier schools in existence, where the young recruits, already selected at the general mustering, are trained in five months. Both the Swiss mountain troops, who have also become specialized troops, and the recruits come from all classes of the population.

It is well known to German soldiers that, most of the time, intelligence, courage, and cheerful determination mean more than physical strength in the execution of various tasks. The young Swiss grenadiers have shown themselves in their maneuver exercises not only physically well trained but also imbued with the seriousness and the importance of their defense tasks; and their reaction to unexpected tactical situations seems purposeful and appears to be characterized by determined readiness for action.

The main weapon of the grenadier and of the infantry is the carbine. Every Swiss knows up to his old age how to handle it. In addition to the carbine, the automatic pistol, light machine gun, hand grenade, and bayonet play an important role in the equipment for close combat. In this connection, one can point out the good quality of armament manufactured by the Swiss. In addition to antiaircraft guns, one of the most valuable Swiss products is the light antitank gun (*Antipanzerbüchse*) with strong penetrating power, which is transported on two wheels and which can be taken apart. This weapon is used primarily by the grenadier.

A great captain must say to himself several times a day: if the enemy appears on my front, my left, or my right, what should I do?

—Napoleon

"Air Effect"

Digested at the Command and General Staff School from an article by Air Commodore A. W. F. Glenny in *The Aeroplane* (Great Britain) 4 August 1944.

APPARENT diffusion of effort in both space and purpose characterized the air operations preceding D-day, has persisted since, and will tend to continue. Many objectives altogether outside our intended theater of operations in Normandy were attacked before the landing, notably the Scheldt canal, which was severly damaged. German war commentators put a name to this widespread dispersion of air effort. They called it "military rabies." But there was method in our madness, for we mystified and misled the enemy, by widespread air attacks, as to the intended area for the land offensive to which air operations were the prelude. Furthermore, we forced dispersion on to the German air defense forces which tended to make them weak everywhere and strong nowhere, a factor which gave our bombers greater freedom of movement to proceed on their missions than would have been possible if our air attacks had been concentrated in space, geographically, inviting similar concentration, tactically, by the Luftwaffe fighter squadrons. One result was that Avro Lancasters were able to carry out precision bombing in broad daylight, giving air attack support for the Army new weight and importance.

The lists of air targets in the communiqués, however, although they conveyed the impression that the air forces were in a state of "perpetual motion," gave little or no inkling of what the motion was trying to achieve. Neither did the communiqués tend to give true pictures of the actual effects of air action from day to day. Impressive figures of thousands of sorties, bomb tonnages, vehicles destroyed, and so on, are no true measure of results, either in terms of physical destruction of objectives or, which is far more important, of the consequences which follow destruction.

A great deal of confusion of thought on this matter can be observed, and unless there is a better appreciation of "air effect," of the contribution air power is making towards winning the war, the majority will think of the defeat of Germany's strength (her land power) solely in terms of battles won, territory and prisoners taken by our land forces, and the casualties suffered in the process.

For a full understanding of air power, the effects of the successful accomplishment of the many subsidiary air tasks undertaken must be understood in detail. Consider, for example, the part these played in getting the Allies ashore in Normandy and in enabling them to build up, as General Montgomery says, "two great armies," of which the physical evidence is a huge mass of men, weapons, vehicles, and supplies, enough, one might have thought, to burst through the beachhead by its own weight and density.

Fundamentally, the safe passage and subsequent build-up of this great military mass has been due to the protection afforded by air superiority. Without it we could not have exercised our sea-carrying power to get the men and the stuff across. Had there been Luftwaffe reaction, of which Dieppe gave promise, warships could not have shielded the transports from much loss and confusion. But in the press generally there has been some pretty hot competition from naval correspondents on behalf of sea power, and so the vital effect of air superiority has not stood out as it should.

Turning to other air actions subsequent to our landing, one correspondent suggests that they were only partially successful in that the "surface" results achieved in terms of weakening the enemy's holding power along our beachhead perimeter were insufficient, in the sense that our troops could not break out of it with ease. In contrast, another correspondent thought that, had the weather not been so impossible, air assistance would have enabled us to break down German resistance without much exertion and with considerably less casualty risk. Both, however, attach great importance to air effects, and say that because

these did not materialize, for one reason or another, ground progress was slow. The answer to the accuracy of this lies in an understanding of the air effects which were sought. The effects of air attack are created through the medium of the destruction caused, which varies enormously in accordance with the attendant circumstances. The value of air attack support cannot therefore be judged unless as much weight is given to those circumstances as to the purely destructive power of the air weapons over their targets.

The air operations concerned can be classified for convenience of examination under three headings:

Battlefield "deluge" bombing by heavy bombers.

Isolation of the battlefield.

Harassing air action and very close offensive support on and close to the battlefield.

There are three good examples of "deluge" bombing: on the German counterattack assembly near Villers Bocage; on an area about a mile square, 2,000 yards ahead of the troops, which preceded our entry into the northern part of Caen; and preceding the armored breakout onto the plain. The first was intended to break up and disperse an enemy attack; the second and third to destroy all enemy resistance in the path of our intended line of advance. From the airmen's point of view, all three were successful operations. From the soldier's point of view, however, a different picture is presented.

The first achieved its purpose of breaking up the enemy counterattack assembly. Its surface result was entirely satisfactory.

The second, on the other hand, had effects more like those at Cassino—stiff fighting and limited progress rather than breakthrough and deep thrust forward, as at El Hamma and after "Tedder's carpet" before Tunis. The reason was that the land attack did not begin until four hours after the air attack was over, and the land operation had a limited objective, to secure more favorable ground. Thus while there were no spectacular results from the air action, because these were not intended, it is evident that the interval between air and land attack was long enough for the enemy to stage a recovery, as he would do after an artillery barrage under similar circumstances.

The third deluge attack succeeded to the extent that it enabled us to break into the enemy's defensive crust with very light casualties, but did not create enough destruction to permit a breakthrough. And the reason it did not do so seems to be primarily because at the time it suited us to save casualties and not press home the initial advantages gained, at the risk of losses. Not to press them home may have been sound policy so as to induce the enemy to move in more forces and attempt to hold us, our ultimate object being to destroy a greater mass of the enemy in men and material within a selected area than would have been possible if we rushed through at first. There may have been other reasons, but the full consequences of air action of this kind are not necessarily determined by the air forces themselves. They follow often from the subsequent action of the land forces, and unless the two can be put together no judgment is possible of the efficacy of air attack one way or the other.

Some general and important deductions are, however, possible. Evidently, area bombing of this kind has quite different consequences from destruction of some pinpoint, the elimination of which is an end in itself. The effect is temporarily stunning, causing disorganization and damage within the area. Therefore there must be a quick follow-through of horizontal land pressure to exploit the effects created by vertical attack. If there is not, the full advantage of air effects will not materialize.

By contrast, destruction of objectives such as radar stations, gun emplacements, and fixed defenses, tends by itself to be absolute and decisive, without the necessity for pressure from the land forces to produce the desired aftereffects.

Now if these considerations are applied to the task of isolating the battlefield, their effects will be seen to be nearer those of

deluge bombing than of pinpoint material destruction of an object whose loss in itself has lasting effect.

The road and rail network of northwestern Europe provides the enemy with so many routes alternative to those under attack that the loss of one or more can be made good by the use of others, or patched up by expedients such as the pontoons to replace the Seine bridges. Hence, attacks on the enemy's communications create physical difficulties for him which he can overcome if he is given time. Conversely, they confer time advantage on us; hence our build-up after D-day unhindered by enemy counterattack in superior numbers. While the enemy's time schedule problem, however, is made acute by air action in terms of delay or confusion, it can only be turned into crisis by the horizontal "pressure" of battle and movement in his forward areas. In principle this is the same as the relationship between deluge bombing and the essential follow-up by land forces. The one is incomplete without the other. Air action, therefore, to isolate a battlefield does not by itself, and is not intended to, produce territorial gains unless it can absolutely deprive the enemy of all reinforcement and supply by stopping all his points of exit and entry. This was possible in Tunisia with air control over the sea. It would be possible if the area to be sealed off is small and the communications reasonably few in number.

In Normandy, however, the area chosen for isolation was enclosed by the sea to the north and west, the Loire to the south and the Seine to the east. Its outer or inland limits had to be deep into France to ensure that the enemy could be delayed in the space between those limits and our front—a depth in places of over 200 miles by road or rail. Had the depth been less, the time delay which air attack could effect on the enemy might have been insufficient to cover the anticipated time for our build-up. Probably also because a river line is fairly easy to follow and keep under observation from the air, and the effect of destruction of bridges across it is probably greater than can be achieved by attack on roads or railways. Points such as these are extremely important, for they determine the practical rather than theoretical assistance which air attack can give to our armies just as other considerations influence the practical and tactical effect of artillery support. Nevertheless, the boundaries of the area in which the enemy's movements to and from the battlefield were to be "isolated" enclosed something like 40,000 square miles! "Blockaded" would be a better term, for air action under these circumstances seeks to blockade rather than isolate; and, as with sea blockade, the enemy can always filter through, and that is what he did. Neither the Commander in Chief land forces, nor the Air Officer Commanding in Chief air forces expected anything else.

That the air blockade would react in positive terms of defeat of the enemy as represented by territorial gain was never expected. If land force pressure from inside the beachhead had been possible earlier, air blockade effects would, however, have been greater in terms of enemy weakness to our land offensive thrust. No doubt for excellent reasons the land force pressure did not come into force until many weeks after the air blockade started, during which time enemy forces filtered through, harassed and weakened, but still able to fight stubbornly.

There was, however, effective "clobbering" of enemy forces and material trying to move inside the area of our air blockade, which will have greatly weakened the enemy against the strain of the battle of movement into which he must be forced if we are to get the war over this year. But the results will not be apparent yet, for basically air blockade of this kind has a purpose defensive to the land forces, and land offensives alone win battles and gain territory.

In the third and last air task under review —harassing attack and very close support— the Hawker Typhoon has earned pre-eminence with its precision and terrific rocket punch, effective up to about half a mile in straight line range. Great as the Typhoon's destructive power and demand have been up to the present to deal with 88's and mortars, the conception that it should be the principal means

of destroying the enemy's weapon resistance, his hull-down tanks, sniper positions, and so on, seems to be fundamentally wrong. The idea seems to have sprung from the circumstances under which it was used in the fighting round Caen, where the situation was rather similar to very early stages at El Alamein. For this kind of fighting with limited hedge-to-hedge objectives, close precision air support can be, and has been, of great assistance.

The Tactical Air Forces have not been created and equipped for the purpose of being an "in-fighting" weapon such as is evidently required to overcome antitank guns, snipers, and all the rest of the paraphernalia which makes up the tactical holding power of the Wehrmacht. They may be useful to that end, but their primary purpose is to create disorganization, demoralization, and destruction in a war of movement. Close support attack aircraft and the weapons they use are at their maximum effectiveness only against an enemy driven out into the open, which was proved again and again in the Mediterranean campaign. Give fighter-bomber aircraft enemy tanks, vehicles, and concentrations to destroy, and their effect will be decisive. Use them to break up concrete, or snipers' nests, and they are being put to wrong purpose.

As a summing up of the foregoing, the full results of air action cannot always be judged by the effects that it achieves. Air attack power is primarily, as now being applied in Normandy, striking power. It creates circumstances favorable to exploitation of horizontal power by land forces of which the characteristic is to press forward, to capture, and to hold gains. Air attack power is, however, decisive in the sense that it creates circumstances favorable to the development of those land force characteristics.

When air power is harnessed to land power there is always a tendency for its effort to be put to defensive casualty-saving purposes —silencing of enemy batteries and radar stations, deluge bombing, blockade of the battlefield, and close support attack. All these are intended basically to weaken the enemy's "surface" resistance and so to ease the tasks of our land forces. The time is near at hand, however, when, with the German Army forced into a war of movement, the Allies will be able to change the purpose and then the air forces will be employed in a true offensive to destroy the Wehrmacht in the open, rather than by action protective to our armies to enable the latter to accomplish that purpose without casualty lists reminiscent of the Somme and Paschendaele.

Air effort will be given more and more offensive quality, instead of defensive significance, and the effects of air action will be in terms of large-scale and positive destruction of Wehrmacht units and formations, which cannot be expected when the air weapons have to be used mainly for destruction of bridges, railways, and concrete, as was the case for many weeks after D-day.

The 5th Indian Infantry Brigade in Syria

Digested at the Command and General Staff School from an article by Major W. G. Hingston, 1st Punjab Regiment, in *Army Quarterly* (Great Britain) July 1944.

THE campaign in Syria of June and July 1941 was undertaken with the greatest reluctance not only for sentimental reasons and the dislike of fighting against a former ally [the French], but also because it used men and material urgently required in the Western Desert.

The advance into Syria from Palestine was made in several columns. On the right was the 5th Indian Infantry Brigade which had come from the Western Desert.

In the Brigade Group were two British units, the 1st Field Regiment, Royal Artillery, and the 1st Battalion Royal Fusiliers.

The Indian units were the 3d Battalion 1st Punjab Regiment; the 4th Battalion 6th Rajputana Rifles (known as the "Raj Rif" from their shoulder titles); the 18th Field Company, Royal Bombay Sappers and Miners; and signal, supply, medical, and ordnance units.

On the night of 14-15 June the Allied forces had reached the line of the river Nahr el Aouaj, the hills southeast of Kissoue (pronounced Kiswe) having been captured by Fighting French troops two days before (see sketch). The 3d/1st Punjab Regiment and 4th/6th Rajputana Rifles were facing the Vichy positions opposite Kissoue. The Royal Fusiliers were at Quneitra.

The Vichy forces, about equal in numbers but considerably superior in tanks and armored cars, held an extremely strong position. On the west, gardens and houses provided ample cover for infantry and tanks, and the bulk of the enemy mobile troops were concentrated in this area. West of the village of Najha rose the Jebel Abou Atriz, almost sheer, and its continuations the Jebel el Kelb and the Jebel Tannouriye, precipitous hills well fortified and strongly garrisoned. West of the main road was Tel Kissoue, a big rounded hill, with Tel Afair north of it. Finally, even farther west was the great hill of Jebel Madani commanding both the road from Deraa and that from Quneitra. Though these hills do not compare with the mountains of Eritrea or Italy, they are nevertheless very serious obstacles, with an average rise from the plain of some eight hundred feet.

Behind the hills is a bare patch, north of which are the gardens. The area is crisscrossed by irrigation channels between which are orchards, cactus hedges, and houses providing a mass of positions for machine-gun nests and hiding places for tanks. The gardens which surround Damascus are thinnest near the Quneitra road, to the west of which is another line of high hills surmounted by four forts overlooking all the low country.

A general attack across the river began before dawn of 15 June. The two Indian battalions had the stiff task of capturing Kissoue itself and Tel Kissoue just behind. The defenses were strong. The village had been thoroughly wired and was surrounded by an antitank trench thirteen feet wide and thirteen feet deep. A number of posts were concealed on the outskirts, while within the village itself the many little orchards, intersected by swift-flowing streams, were well wired and defended by machine guns. The task of clearing the village was entrusted to one battalion, and in the hopes of attaining surprise they were given no artillery support.

Both Indian battalions were brought up in lorries and then the [3d Battalion] 1st Punjab Regiment moved forward to the attack. The night was quiet as the tomb as the men crept forward, equipped with hastily constructed scaling ladders to aid them to cross the ditch. At 3:20 AM the stillness was suddenly broken by the shatter of machine guns and the explosion of bursting bombs. The [3d Battalion] 1st Punjab Regiment had completely surprised the Vichy troops and after some heavy hand-to-hand fighting in the village had captured the whole of it.

At 5:15 AM the 1st Field Regiment began to register on Tel Kissoue behind the village, and the Rajputana Rifles went forward to attack at 9:00 AM. By 9:50 AM Tel Kissoue was in the hands of the "Raj Rif."

Meanwhile the Punjabis in Kissoue were subjected to much shelling and shortly after midday were counterattacked by a Vichy battalion with tanks. This attempt was strongly pushed but failed. Another assault also failed. Later still a squadron of Spahis came galloping across the plain towards the village, but these Punjabis were as staunch as against tanks and the horsemen retreated, leaving many dead and wounded on the ground.

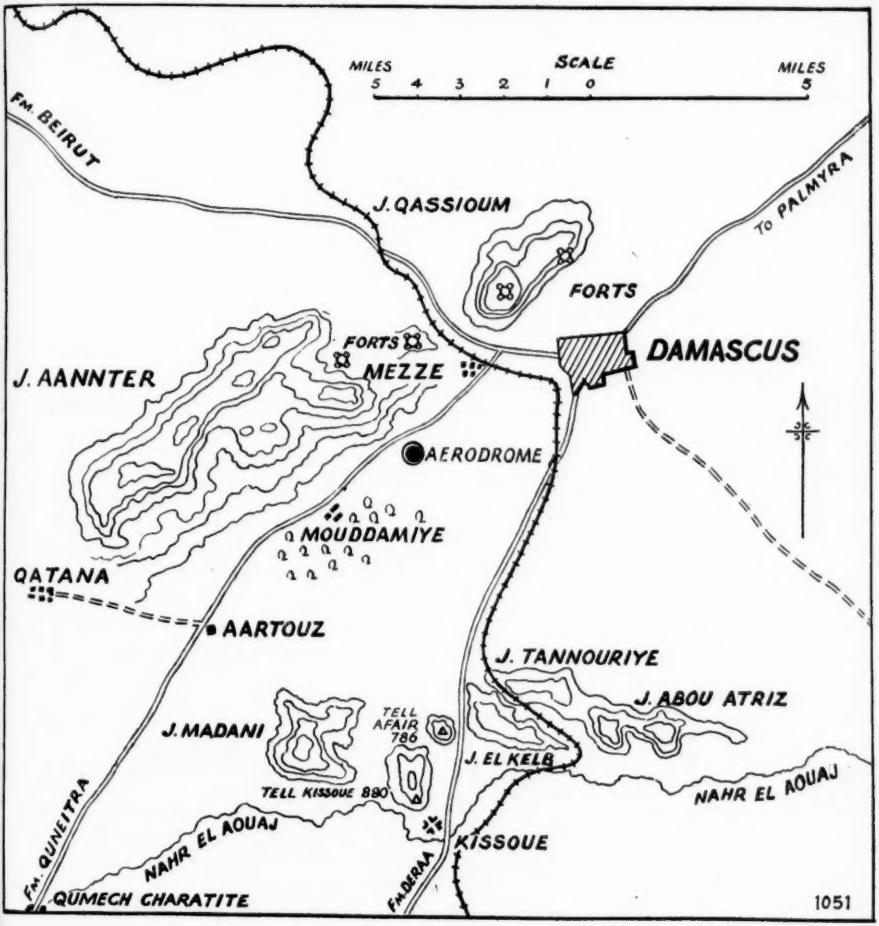
But the two battalions had not yet finished. After dark they started off northwest to capture Jebel Madani, the Punjabis directed on the southern ridge and the Rajputana Rifles on the northern. By dawn the two Indian battalions were in full possession of the hill, looking forward and down on the city of Damascus itself.

On other fronts the situation was much less satisfactory. The Fighting French on the right flank were hard pressed, while at Qune-

itra the Royal Fusiliers were in a desperate plight. During 15 June the latter's outpost company had been driven in and a strong attack launched on them at this important road junction. After desperate fighting, the Fusiliers ran out of ammunition and had to surrender.

On 17 June the *Bataillon de l'Infanterie de Marine* (BIM) occupied Aartouz and with the help of the Bombay Sappers and Miners turned it into a tank-proof locality, although they and the Indian battalions on the hills were severely bombed.

On the evening of 18 June the two Indian battalions set forth on what turned out to be one of the most heroic and desperate actions of the war. The plan was to pass right through the enemy lines during the dark and seize the village of Mezze, cutting the Vichy line of retreat by road and rail to Beirut. The



Fighting French were to cooperate by attacking up the main road from Kissoue to Damascus. One company of the 3d/1st Punjabis was left to hold Jebel Madani. The BIM remained in Aartouz but was to move up to Mezze at daybreak with the artillery and antitank guns which could not go forward across country during the dark. The sole surviving company of the Fusiliers was in reserve, while the few tanks available had to be left to guard the exposed desert flank.

The column formed up south of Aartouz and at 8:30 PM began to move. The route lay west of the road; but a column of twelve vehicles, containing ammunition, food, and medical supplies, moved along the road parallel to the rear of the column. The Sikh company of the Punjabis was given the task of dealing with the fortified hamlet of Mouddamiye, which had held out against the BIM the day before.

While the column was forming up, the area was heavily shelled. All hell was let loose from in front and both sides while the road itself was intensively shelled. The column, however, was not affected as it was some distance off the road.

The company attacking Mouddamiye put in a most gallant attack at 10:00 PM. Twenty-seven men only got through to the far edge of the wood, but they had scuppered this strong enemy post and thus enabled the main column to proceed.

On the other side of the road, the Hazara company of the Punjabis continued the advance, knocking out some enemy machine-gun posts and side-stepping others. By 11:00 PM they were through the first enemy line. In the pitch dark there was great confusion, and on one occasion two parties were only just prevented from attacking each other. In the meantime the transport column, moving along the road, outstripped the marching troops. It bumped into a road block, covered by an antitank gun and machine guns. Some vehicles were knocked out, and the transport never rejoined the battalions.

The column pushed onwards and at 4:15 AM got within attacking distance of Mezze after a twelve-mile march against opposition, over unreconnoitered country, and in utter darkness.

At 4:30 AM the attack started. Three guns firing down the road were knocked out with tommy guns. Again hell was let loose, but the attack was not checked for a moment. After an hour of hard individual fighting the village was secure.

A company of Rajputana Rifles passed round the village and cut the main Damascus-Beirut road, driving away a cavalry screen. At 9:00 AM they were attacked by five heavy tanks and retired in good order to Mezze.

The Fighting French forces, which were to have advanced down the main road, had never started, nor was there any sign of the BIM with the guns. So at once the work of putting the village into a state of defense was begun. It was realized that very considerable forces would now be available to counterattack the village and that there were large numbers to be brought against it. Brigade headquarters, with both battalion headquarters and a company of each battalion, were established in "Mezze House" which had a walled garden on the northern outskirts. The other companies made defended positions inside the village. All this time there was slight machine-gun fire and some shelling.

Shortly after 9:00 AM Vichy heavy tanks attacked the men preparing road blocks. All through the morning, attacks developed on the isolated defended localities; the tanks broke through into the village and fighting was intense. The accurate fire of the Indians prevented the enemy infantry from coming in close, but the tanks were just outside the houses, firing through the windows and doors. About 4:00 PM one of the companies of the Rajputana Rifles had to surrender.

The attacks continued and alternated with heavy guns on the hills above shelling the village over open sights. During the afternoon the assault was concentrated on Mezze House, to which as many men as possible had been withdrawn from the other localities. The garden wall provided a tank obstacle, though the tanks were able to fire down the drive from the square, a distance of possibly 200

yards. The house was used as a hospital for the wounded.

Attacks continued till nightfall when it was decided to send news of the desperate state of the defenders back to force headquarters. Ammunition was getting short. Except for a little fruit in the garden, which was doled out to all, no food had been eaten for twenty-four hours. There were about fifty prisoners also to be provided for. The number of wounded was large. The wounded carried on fighting, some men coming back three times for bandaging and then returning to their posts.

At 8:45 PM two British officers and one jemadar [native Indian officer] set off back to force headquarters. The three crept through a hole in the wall and after dodging below a tank which was firing at the house, swam the stream just beyond. Behind them they could hear yet another attack taking place on Mezze House, while as they rested they watched by the flashes a counterattack taking place on the Rajput company of the 3d/1st Punjab Regiment on the hill.

At half past five they reached force headquarters in a state of utter exhaustion.

Meanwhile in Mezze House the attacks continued but were driven off by a great defense. Ammunition was getting woefully short, but the fire discipline of the troops was magnificent. At 1:30 PM the Vichy forces, having brought up 75's very close, started shelling the house at point-blank range. While this was happening the enemy scaled the walls, but for the last time were driven back.

The relieving column could be heard fighting its way up past Mouddamiye. It was decided to ask for an armistice in order to evacuate the wounded, and then to continue the fight. But the enemy on sighting the emissary with the white flag thought it was surrender and rushed the gate beside him. The remnants of a company of the Rajputana Rifles made a desperate attempt to cut their way out, but it was hopeless. All was over.

It had been a fight the like of which can rarely have been seen before, and this gallant defense made possible the capture of Damascus next day. All the Vichy forces had been drawn off to concentrate against the defenders of Mezze, and so the Fighting French forces operating on the right were able to enter the town.

The Punjabi Mussulman company, the remnants of the Sikh company of the 3d/1st Punjab Regiment and two companies of the *Bataillon de l'Infanterie de Marine,* supported by the 1st Field Regiment, were sent to relieve the garrison. They fought their way along the foothills. But when they reached the village, Mezze was silent and deserted. The battered garden walls and the damaged house, the burnt-out tanks, and the dead bodies were eloquent testimony to the terrific fight.

Cooperation Between Pursuit Aviation and Ground Defense

Translated at the Command and General Staff School from a German article by Wolfgang Küchler in *Hamburger Fremdenblatt* 31 July 1944.

AN American flier, whose four-motored Boeing bomber was recently put out of action by a direct hit of our antiaircraft artillery and who was the only one of the crew of ten to be able to bail out with his parachute, landed in the vicinity of the antiaircraft battery. After he had recovered somewhat from his terror and lighted a cigarette, he nodded, by way of recognition, to the German gunners and said: "Damn! The antiaircraft fire was so thick we seemed to be flying over a thick, black carpet. I can congratulate myself that I am still alive."

A radio operator attached to a four-motored bomber which was shot down during one of the last daylight attacks on Berlin subsequently declared that there was certainly one thing in Germany that was not rationed, and that was the antiaircraft artillery.

This recognition accorded us by the enemy

is matched on the other side by the unlimited praise given by the German soldier in the western areas, who sees in the person of the antiaircraft artilleryman—formerly an object of jest—an indispensable helper and comrade in arms.

The number of planes that the antiaircraft artillery has been able to book to its credit lately speaks a language of its own. Thus, since the beginning of the invasion, nearly 1,000 planes have been shot down in the west alone by the antiaircraft artillery. In the area of the Reich, also, the antiaircraft artillery has caused considerable losses to enemy bomber and fighter formations. As remarkable as these defense successes may be, it would, nevertheless, be erroneous to evaluate the effectiveness and success of the antiaircraft artillery on the basis of these numerical results alone. To be sure, there are many pursuit formations which, in the same period of time, perhaps, are able to show several times that number of planes to their credit. A hastily drawn conclusion, which would savor more of the lay mind than otherwise, might easily lead to the idea that with a reduction in the amount of antiaircraft artillery and an increase in pursuit aviation, the results could become still greater.

Today, aerial operations over Europe are, however, determined more than eyer by cooperation between pursuit aviation in the air and the gunner on the ground. Indeed, it is precisely these hand-in-hand tactics that constantly impose such losses on the enemy. The innumerable concrete and bunker positions in the western part of the continent, the antiaircraft artillery towers constructed in accordance with all the refinements of the construction principles of the modern fortified work, the mobile antiaircraft artillery trains which are employed over the stretches of European railway track, the great number of field positions and batteries grouped about the large cities, industrial works, railway stations, and airfields constitute an essential part of the deeply echeloned system of air defense in which there is scarcely a break from the coasts of western Europe to far into the interior of the continent.

In order to be able to evaluate the work of the antiaircraft artillery, it is necessary to be clearly aware of just what possibilities are offered to and what limitations are imposed upon ground defense in case of enemy air attacks. But one thing must never be forgotten in this connection: owing to the three-dimensional nature of the air, it will generally be possible for a bomber formation to carry out an attack if it accepts heavy losses as a matter of course. Whether or not such an attack has paid the enemy depends on how far the defense has succeeded in preventing a concentration of the bombardment, or whether the actual useful effect of the raid bears a favorable relationship to the losses that are sustained.

The highest aim of air defense must always be the definite destruction of the attacking enemy. Hence, antiaircraft artillery will always aim at bringing down the enemy planes. But its success must not be judged alone by the number of planes brought down, for the definite scoring of hits will always remain the most difficult problem of the antiaircraft artillery.

As soon as the enemy bomber and fighter formations get over the Reich, they are met by the concentrated fire of the antiaircraft batteries. When the heavy shells burst in the midst of the enemy formations, the enemy is often forced to extend his flying order. This first disruption of the close formation, this combing out and attack of the enemy, is in itself to be evaluated as a positive defense victory, for by means of their well-aimed fire, the gunners have smoothed the way for their own fighter planes. By means of their bursts of fire—comparable, perhaps, to the barrage which precedes a ground attack—they have produced the first confusion in the enemy air armada. The pursuit and destroyer planes are now able to launch a general attack, for in his loosened formation the enemy is no longer so well able to defend himself as in his close-meshed order.

It is quite immaterial who finally brings down the enemy—whether it be the antiaircraft artillery or the fighter planes. But it is highly important that the cooperation of

these two most vital factors of air defense achieve as great a combined success as possible. The number of planes brought down during the last few months shows how well ground defense and air formations are fitted to cooperate with one another in the German air arm.

In the case of concentrated antiaircraft artillery fire, many enemy planes receive hits in their motors or plane controls or other vital parts. They are able, perhaps, to fly for a short distance, yet as a rule they have to drop out of their formations and so they either fall victims to pursuing German fighter planes or are forced to make an emergency landing somewhere. For the way back to the coast is a long one, and on this route the bomber comes time after time within the range of the batteries till it finally, somewhere, goes spinning to the ground, mortally stricken.

The fact that, in daytime as well as at night, enemy bombing formations almost always make their attacks from great altitudes is infallible proof of the effectiveness of the German ground defense. By flying at these heights, the enemy hopes to escape heavy losses. When the Americans attempt to strike their targets from medium altitudes or even in low flight, they nearly always have to pay for their operations with considerable losses, for in these cases they come within the effective range of the light and medium artillery which, with its high rate of fire, brings down many a plane out of the low-flying formations. Its use in the front area has already led to a noticeable relief of the ground forces and imposed greater caution on the enemy planes assigned to the mission of highway strafing and low-flying attacks. Thus, for example, a light antiaircraft artillery battalion alone in the Caen area destroyed over twenty enemy planes in the course of five days.

These results on the part of the light antiaircraft artillery are especially remarkable since they were achieved on very fast planes which are naturally harder to hit than the slower bombers. Only for a few seconds are the fighter planes within the range of the light weapons, but during these few seconds the fate of many of them is sealed.

When bad weather renders the use of the German pursuit aviation impossible, the combat of enemy fighter planes which had enjoyed favorable conditions at the beginning of their flight must often be left to the antiaircraft artillery alone. The antiaircraft artillery is forced to make use of blind fire. But the Anglo-Americans have often found that even then the German antiaircraft artillery can become extremely unpleasant.

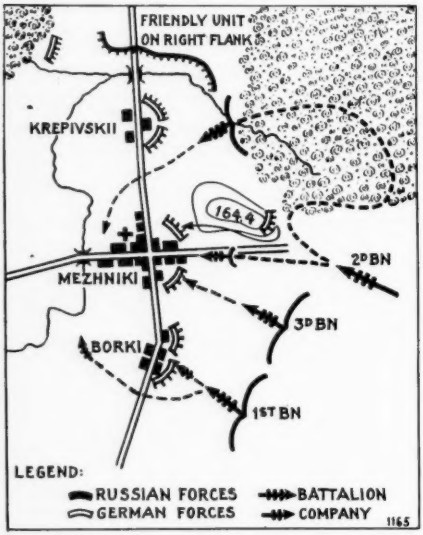
Maneuver in Battles for Populated Places

Translated at the Command and General Staff School from a Russian article by Captain M. Makukhin in *Krasnaya Zvezda* (Red Star) 6 August 1944.

THE approaches to East Prussia are covered by a dense network of roads. This is reflected in the character of our operations, which are primarily battles for populated places situated at road junctions and transformed by the Germans into strong centers of resistance. The outcome of the battle for a populated place is decided by the maneuver. Frontal attacks are followed by turning movements and envelopments of the enemy flanks and by sudden blows inflicted on his troops. The frontal attack not only disorients the enemy as to the direction of the main effort, but also disrupts the regrouping of his forces towards the threatened flank, thus creating advantages for the attacker and opening wide possibilities for maneuvering. The following is an example from the combat experience of the "X" Infantry Regiment which won a battle for an important center of resistance as a result of a skilful maneuver.

Advancing westward, the regiment reached, by the end of the day, the vicinity of the village of Mezhniki, and encountered organ-

ized resistance near Hill 164.4 and on the approaches to the village of Borki (see sketch). At that time, the unit on the right flank, counterattacked by considerable German forces from Krepivskii, shifted to defense on the bank of a nameless stream. It was obvious that the enemy had transformed Mezhniki into



a strong center of resistance composed of a number of strongpoints. The mission of the regiment was to capture Mezhniki.

Reconnaissance played an exceptionally important part in the accomplishment of this mission. It was active continuously from the beginning of the battle to its end. It was established that the enemy had concentrated his main forces in Mezhniki and in the vicinity of Krepivskii. The other strongpoints were held by comparatively small forces. The most favorable information came from the reconnaissance operating on the right flank. Here stretched a forest which could serve as a concealed approach leading almost to the gap between the two strongpoints. Abatis and mined areas were found along the edge of the wood. Nevertheless, this direction was the most favorable. It was a vulnerable spot in the enemy defenses, and this helped the commander make the correct decision. His plan of attack was as follows. Two companies of the 2d Battalion, with attached antitank artillery and heavy machine-gun units supported by tanks, were to reach the junction between the two strongpoints, outflank Mezhniki from the north, and dig in on the western outskirts of that village, cutting off the only German route of retreat to the west. Simultaneously, the 1st Battalion was ordered to envelope Borki from the south, in order to intercept the enemy's routes of retreat in this direction and to prevent the arrival of reinforcements for the rescue of the attacked garrison. The 3d Battalion and a company of the 2d Battalion were to attack Mezhniki frontally, in order to divert the bulk of the garrison toward them.

Subsequently, the success of the battle depended on rapidity and coordination in the operations of our units, and this was achieved. The commander of the 2d Battalion made an additional reconnaissance of the routes for advance, and posted road markers. The sappers built a bridge for the tanks, and cleared the abatis from the road. By dawn the units had reached the western edge of the woods; the tanks at that time were along the eastern edge. As soon as our artillery opened fire, they advanced to their position of departure and, together with the infantry, attacked the enemy. The Germans were taken completely unawares by the attack launched simultaneously from several directions.

Particular skill and determination characterized the action of the 2d Battalion. The men advanced without lagging behind the tanks, and soon reached the western outskirts of the village. One of the platoons captured the bridge and consolidated its positions on the western bank of the stream. The rest of the battalion attacked the German garrison from the rear. At the same time the 3d Battalion rushed into the eastern outskirts of Mezhniki, while the 1st Battalion encircled the village of Borki. As a result, the German group was smashed to pieces and surrounded piecemeal. Under the impact of the unexpected assault and fire action, the enemy became

panic stricken and was completely routed. Our fighters annihilated more than 800 and captured 1,500 German men and officers, as well as sixteen guns and other military equipment. The success of the action was a result of a correct estimate of the enemy forces, a skilful use of the terrain, and a brilliantly conducted maneuver.

It would be incorrect to evaluate the action of the infantry without considering other types of troops. Heavy reinforcement of the troops with artillery and tanks and the unchallenged supremacy of our air force enable us to maneuver in rapid tempo and on a large scale. Here is an example.

Opposite one of our units, the Germans had a series of defensive lines prepared in advance. Our units crossed the river and encountered stubborn resistance. On the central sector of the front, the enemy launched numerous counterattacks by forces ranging from one battalion to two or three infantry regiments, supported by twenty to thirty tanks and by bomber aircraft. While the Germans were wasting their forces in fruitless counterattacks, our command managed to concentrate secretly a large mobile unit on the west bank of the river. Particularly effective were the operations of the Soviet aircraft. Our fighters destroyed a great number of enemy planes. Then we launched a series of strong attacks against the fortified positions on the German left flank. Our units captured three populated places. The enemy was threatened with a breakthrough of his defense and with a penetration by our troops into the rear area of his center. This forced him to discontinue his counterattacks and to make a hurried displacement of considerable forces from the right flank to the left.

The operations undertaken by our units on the enemy left flank had an auxiliary character. Their purpose was to divert the enemy's forces. This mission was accomplished successfully. As soon as the reconnaissance reported the regrouping of enemy forces toward the left flank, our mobile units which were concentrated on the enemy right flank rushed into action. Up to the last minute the Germans did not know of the presence of these troops. Striking to the north, the tanks and motorized infantry overcame the German field fortifications without difficulty, and then turned to the west, destroying on the way the garrisons of the enemy strongpoints. By next morning the mobile group, having covered forty kilometers, had reached a railroad station which the Germans used for supplying their forces, and captured it. The appearance of the Soviet tanks deep in the enemy's rear affected immediately the enemy forces defending other sectors. At first the Germans threw their reserves against our mobile group, but at that time our units struck first at the enemy's left flank and somewhat later at the central sector. The German defense in its entire length was broken through, and the troops on which the German command so strongly relied were forced to surrender or withdraw. Thus again a rapidly and suddenly executed maneuver formed the basis for the success of our troops.

We have examined here two concrete examples of a skilfully conducted maneuver. What conclusions may be drawn from them? The experience of the recent battles on the approaches to East Prussia demonstrates the increased mastery of our officers, and their skill in rapidly discovering the weak spots of the German defensive system and in employing, depending on the situation, various types of maneuver. As a rule, the success of the maneuver is conditioned by the strong reinforcement of the attacking infantry with artillery and tanks. The availability of mobile artillery enables the commander to concentrate a strong artillery force rapidly in support of the main effort and to punch a hole in the German defenses. This helps the infantry and tanks to uncover the enemy flanks and to shift to combat by maneuvering. The tanks and self-propelled weapons supporting the infantry accelerate the tempo of the maneuver and increase the scale of the operation. The unchallenged supremacy of our fighter and attack aviation enables us to engage in daring maneuvers even in open terrain and in daytime.

However, maneuver by itself does not secure success, for the maneuver is always followed by the battle. Therefore, the commander who makes a decision with respect to maneuver should first of all consider the peculiarities of the forthcoming battle and familiarize himself with both the terrain and the capabilities of the enemy. These data can be obtained only through uninterrupted activity on the part of the reconnaissance, which is one of the main prerequisites of a successful maneuver in offensive operations.

Use of Geology in the War Effort

An article by Dr. N. F. M. Henry, Dr. N. E. Odell (late Major, R. E.) and Major W. A. Macfadyen, M. C., M. A., R. E., in *The Royal Engineers Journal* (Great Britain) June 1944.

IN the Empire at present, the part that geology can play in war time is undervalued on account of lack of appreciation of its potentialities.

The Report on the Work of the Royal Engineers in the War of 1914-1918 states: "Should the British Empire in the future become involved in another war, there can be no question but that the existence of an adequate Geological Staff from the commencement would be the means of much saving of expense, labor, and life."

Geology is not one of the sciences which occupies a dominating position in the war effort, but is of great value to engineers, both in home base countries and at the fighting fronts. The lessons which were learned by bitter experience in the last war have not yet been applied in this, and they, with the uses of geology in war, are set out in this memorandum.

In view of the size and varied nature of the fronts on which our troops are fighting or may be fighting, it seems essential that an adequate Geological Section of the Army should be set up.

The Uses of Geology in War

1. Strategical: The survey of new resources of raw materials for industry to replace those lost; to increase output and reduce transport by developing alternative sources.

2. Tactical: To give advice on problems concerned with water supply and the use of rocks and soil (e.g., the construction of fortifications and foundations, sites for airdromes, camps, and positions, drainage, tunneling, roads, and dams).

As has been well summarized by Professor W. J. Mead (*Geology, 1888-1938: 50th Anniversary Volume of the Geological Society of America;* section on "Engineering Geology"), a study of terrain for military purposes calls for all available knowledge of surface and subsurface geological features. The nature and depth of surface soil and subsoil, its moisture content, and the position of the water table are fundamental to movements of troops, etc., away from paved roads and railways, to trenches, dug-outs, and earthworks in general; to effects of artillery fire, and in many other important connections. "Solid" geology is needed for deeper subsurface operations, defensive and offensive, and for all foundation problems. Groundwater geology is vital to water supply problems. Seismology has important uses in artillery ranging. The intelligent use of maps of all kinds—aerial, topographical, and geological—calls for men trained in interpreting surface and subsurface conditions from maps. Military operations demand all the geological services of peace-time engineering with the added factors of magnitude and speed.

The general lack of knowledge of the use of geology is clear from the "Fifth Report of the House of Commons Select Committee on Nationel Expenditure" (dated 28/5/40). In 1939, the Air Ministry acquired 160 acres of land adjoining an airdrome in Scotland for building purposes at a cost of £26,637. This

land was "an undrained bog with a covering of peat to a depth of seven feet lying upon a bed of clay . . . and it would be difficult throughout the length and breadth of this country to find any site more difficult and expensive than this." Work on this site was eventualy abandoned after £250,000 had been wasted.

Work in the War of 1914-18

Early in the war of 1914-18, geological information about northern France and Belgium was urgently needed. It was at first entrusted to the new general section of the Royal Engineers known as F. W. 5. In April 1915, Lieutenant W. B. R. King was appointed as geologist to the Army and for a year he worked alone in this capacity. In May 1916, Major T. W. E. David (later Sir Edgeworth David) of the Australian Mining Corps was put in charge of the work, and later on three more officers were added, making a total Geological Staff in France of five. This was the strength of the section at the end of the war.

In September 1918, a revised establishment for the Geological Section was proposed. It was to be under the Engineer in Chief with a status similar to that of the Camouflage Section, Royal Engineers, and others, and was to include seven geologists.

In the United States Army in 1917, Lieutenant Colonel A. H. Brooks, Director of the Geological Survey of Alaska, was appointed as Geologist to the U. S. Army in France, and in course of time he was given an assistant. After consulting with the British Army, the U. S. Army decided to increase their Geological Establishment with the AEF in France to a total of seventeen geologists. Most of these had been appointed before the armistice.

By December 1915, the Germans had begun in different parts of the front to include geologists in their Army organizations. A Geological Staff, under a former professor of geology, was sent to one of the divisions on the western front. A number of handbooks on the geology of the war areas and on problems of war geology were written. By 1917 the German Army had geologists established at each army and corps headquarters. A captured German document of that same year declared that geologists had proved of particular value during the first reconnaissance of an area, apart from otherwise in their technical advisory capacities.

The Present Position

When the BEF went to France in September 1939, one geological adviser was attached to the Engineer in Chief's staff. Shortly afterwards the French Army, which had previously no Geological Staff, appointed a chief Geological Adviser at headquarters and one to each army group. A second geologist was appointed to the British Army eighteen months after the beginning of the war, and served until recently in the Middle East. Moreover, in that theater, a South African Section of Engineers has been employed on geological and geophysical work. In addition, a geologist was engaged by a well-boring company, Royal Engineers. Unfortunately, there are still too many people who believe in a divining rod rather than a geologist as a means of obtaining water.

In Great Britain the Geological Survey is very busy giving assistance on geological problems to various official bodies. The War Office and Air Ministry are now in constant touch with the Geological Survey on matters connected with water supply, drainage, new airdromes, etc. The Survey has recently produced a small pamphlet indicating to Army Engineers how geological knowledge can be used, but this can only be regarded as a start in this important and many-sided job. The recently formed Inter-Service Topographical Department now has a geological section.

In India, work is hampered by lack of financial support adequate to the size of the tasks which face a Geological Survey having but twenty geologists in this large country. In 1940, however, the Geological Survey of India produced a good set of "Geological Lectures for Military Engineer Officers" distributed to all Royal Engineer Groups. The intention was to supplement the lectures delivered at the three Engineer Schools of the

Sappers and Miners by field work and practical study. The Geological Surveys of Colonial Africa have also been seriously starved of men and money, and it is doubtful if the total number of official geologists in these reach twenty. The contribution to the war effort which they can make is limited by their lack of personnel and funds. Many of their geologists were called away to non-technical service.

Measures Necessary for the Efficient Use of Geology in Our War Effort

In order to give our Army the maximum scientific assistance on all fighting fronts, an adequate military Geological Staff is essential. Out of the hard experience of the last war came the proposal for such a staff, but we are now, in this respect, in the same position as we were in May 1916. Allowing for the rapidity of movement common to warfare today, questions of water supply, airdrome and camp sites, raw materials, etc., are still all-important. The lapse of military mining (tunneling) in this war should not mean the cessation of all geological advice and direction. It is suggested that a Geological Staff should be set up which would provide geological advice at GHQ and at each front, and all base areas. In view of the scope of modern war this will require an extension of the 1918 proposal.

It is imperative, also, that adequate training in engineering geology be included in Officer Cadet Training Units, and advanced or "refresher" courses for military engineers, as similarly it is, or should be, in the case of civil engineers. The American Army, incidentally, now considers it necessary that officers of the Army Engineer Corps, who take a course on the "control of soils in military construction," should attend lectures on "rocks and minerals." This can only be regarded as a minimum requirement.

In Great Britain, a great deal of information is in the hands of the Geological Survey, but more positive steps and much more publicity are needed, and only the appointment of Geological Advisory Officers to each Army Command will ensure that full use is made of geological knowledge. In the Dominions, India, and the Colonies which are now, or are rapidly becoming, war bases and raw material suppliers, considerable increases in the allocation of technical men and of money are urgently required at the present time.

A small number of trained geologists would make a great difference to our scientific war effort. A hundred would set up an adequate Geological Staff in the Army and double the Geological Surveys of India and Colonial Africa. These should be experienced men from the universities or members of the geological staffs of oil and mining companies, who are now in the Army engaged on non-geological work. With the help of the Central Register, the universities, and representative bodies—the Geological Society of London is one example—men could be found for the necessary jobs.

"Stukas on Foot"—Rocket Projectors and Their Mission

Translated and digested at the Command and General Staff School from a German article in *Völkischer Beobachter* 25 August 1944.

THROUGH the medium of the weekly news reels the public has become acquainted with the rocket projectors, and the sight of them has always left behind a feeling of breathless tension when, from the group of tubes, the rocket projectiles shoot forth, causing the air to tremble with their howling roar and then bursting with a thunderous explosion on striking their targets, shaking the very earth. The amazing simplicity of the apparatus and its practicability even under the worst of weather and terrain conditions is in striking contrast with the enormous rate of fire which makes it possible, in the most inconceivably short period of time, to send enormous quantities of explosives crashing down with devastating effect on the enemy.

Many of the preliminary requirements that

must be met in the construction of artillery are not necessary in the case of the new weapon, with the result that its construction is much easier and can therefore be entrusted to factories which have no highly developed and special installations at their disposal. A heavy, finely-built gun is not necessary in this case, since the apparatus merely serves to give the projectile elevation and direction.

What are the missions of this new army weapon and when is it used? In answering these questions, it must first be made clear that this projector is not a substitute for artillery, but rather, a complement of artillery to be used in the production of extreme effects. It is the army's weapon for use at the point of main effort. In attack, it is the battering ram ahead of our infantry; and in defense, the breakwater ahead of our positions. While the artillery primarily lays down aimed fire on individual targets, enemy field positions, and bunkers, the rocket projector takes under fire whole areas, enemy forces preparing for combat, or massed troop formations in attack. Its salvos represent the highest form of destructive fire.

When the rocket projector comes on the scene, there is always "something doing," there is "plenty of fire flying," and the "Stuka on foot," the title of honor coined by the soldiers, has shown itself to be a worthy weapon since it first went into action at the beginning of the eastern campaign. In the orchestra of all the weapons, the rocket projector has been compared to the kettle drum. Just as the latter, in the combined harmony of all the instruments, is used only at certain places, the rocket projector also must be saved for decisive moments even in those cases when it may seem tempting to put it to work before this. Employed at the proper time, it always produces a devastating effect which leads to the crushing victories that have been characteristic of its path thus far. But it is not alone for firing high explosive shells that the rocket-projector troops are employed. One of their very important missions is the firing of smoke shells. From the same launching device shells are fired which, on impact, produce a dense smoke that prevents the enemy from seeing and thus facilitates attacks or withdrawals by our infantry formations.

The demands made on the men of the rocket projector units are quite considerable. In consequence of their frequently changing employment, the rocket-projector units offer the young officer and subordinate commander especially good opportunities for fame, and with pride every member of these units will one day be able to say of himself that he also played his part in the winning of German victory.

Antitank Defense in Offensive Operations

Translated at the Command and General Staff School from a Russian article by Major E. Bova in *Krasnaya Zvezda* (Red Star) 14 March 1944.

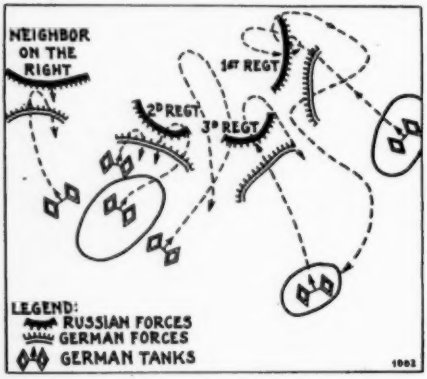
TROOPS engaged in offensive operations should always be ready for defense and especially for repelling enemy tank attacks.

When an advancing infantry unit unexpectedly encounters considerable tank forces, it runs the risk of losing the battle unless timely and adequate measures have been taken. Infantry and artillery should be able to entrench rapidly and get ready for repelling tanks in any situation. It goes without saying that the commander should be able to distinguish between the demonstrative action of small groups of tanks engaged in delaying action, and the preparation by the enemy of an attack by considerable tank forces.

In one of the sectors of the front, an infantry division was successfully advancing together with other units. Various reconnaissance agencies reported an increased activity of the Germans. The number of tanks used by the Germans increased. There was

also an increased pressure by the enemy against our adjacent units. It was obvious that the Germans were trying to test the strength of our forces. And when our aerial reconnaissance reported that about one hundred tanks and up to two regiments of motorized infantry were moving toward our division, the situation became quite clear.

At that time the division occupied an important and fairly advantageous terrain line. During the day and all night the regiments



were busy fortifying the area and organizing the antitank defense. They dug double rifle pits and squad trenches, and at dawn everything was ready. Sappers and even messengers picked up from rear units were building main and alternate observation posts.

The artillery commander, while making his report to the division commander, suggested a deep antitank defense. The division commander then decided to place main antitank defenses in the center of the division zone, where all tank approaches were better observed. Here were also concentrated howitzers, mortars, and some of the 76-mm guns. Most of the regimental and division guns, however, were dug in within the defense areas of the infantry units. In the most important sector, the depth of the antitank defense was from three to four kilometers.

The artillery commander and the unit commanders had taken all necessary measures for meeting the German tanks. The regiments were ready for battle and sure of success. Inasmuch as part of the men had never participated in a tank battle, the political workers told them about the division's previous encounters with tanks and about the successful repulse of their attacks.

On the eve of the German attack, an enemy reconnaissance plane flew several times over our battle position. The disposition of the infantry and artillery and of the antitank defenses could not, of course, remain unnoticed. The Germans, however, did not discontinue their preparations for the attack, nor did they change its direction. In addition to tanks, they brought up artillery and aircraft for the attack.

At 0800 next morning, the enemy opened strong artillery fire against our division. Then twenty-seven enemy planes appeared over our artillery positions.

About half an hour later, eighteen German tanks accompanied by infantrymen started moving toward the sector of the regiment which was located in the center of the division. This first attack was repelled by the concentrated fire of our artillery. The German tanks turned around without having reached the forward edge of our position. The enemy infantry was also repulsed. The battle was still raging when twenty more German tanks accompanied by the infantry attacked the area at the limiting point between the 2d and 3d regiments. They penetrated the forward edge and turned against the left flank of the 2d regiment. Here they were taken under an intense artillery and antitank fire and, having suffered casualties, withdrew. The German infantry was cut off from the tanks by the fire of our infantry; it hit the ground before reaching the forward edge.

The first phase of the battle was successful for the division. Both enemy tank attacks were repulsed. But the enemy did not give up and continued to attack. This time it was an aerial attack with bombers coming in waves. In the second wave there were eighteen Junkers; in the third wave, twenty-four. Having anticipated the possibility of enemy air attacks, our artillery commander gave the necessary orders to advance. During

the first raid, the German planes, obviously knowing the location of the firing positions of our batteries, knocked out two of our guns. Then the artillerymen were ordered to move to reserve positions. Remaining in battle readiness, the batteries displaced gun by gun. As a result, despite three hundred sorties by the German planes, our artillery did not suffer any more losses in matériel.

When the German planes disappeared, ninety enemy tanks, accompanied by a considerable force of infantry, attacked our positions once more. Sooner or later there comes a critical moment in every battle when success is decided by the great effort of the victorious side. The enemy blow had been anticipated, all necessary preparations had been made, several strong enemy attacks had been repulsed, and finally, losses had been inflicted upon the enemy. And then came another attack—the unit was subjected to a new blow the strength of which exceeded many times all the preceding attacks.

The enemy attacked in succession from the right flank of the division toward its center. He had, doubtless, found the boundary between the 2d and 3d regiments. Assuming that the resistance of the division was weakened by the preceding tank attacks, by artillery fire, and by the three aerial attacks, the enemy threw his main forces into the battle. As we found out later, two full German tank divisions and part of a third division had been concentrated in this sector.

It was the right time for our division to commit its antitank reserve. The commander of the reserve managed to move his guns rapidly into the positions which were prepared in advance and opened fire of maximum intensity. But the tanks had already penetrated into the forward edge of the defense. Our wire communication was disrupted. Due to the fact, however, that we had duplicated our communication system and that the artillery officers were located close to the infantry officers and were able to use their communication facilities, the artillery fire was not interrupted for a single minute.

Of great use were the firing data prepared for fires over the entire zone of the division. The worst enemies were, of course, the tanks. They were destroyed ruthlessly and with the utmost energy. At the same time the infantry units cut off the enemy infantry from the tanks. As soon as the enemy tanks passed over our trenches, our infantrymen fired at the German infantry. Four times dozens of enemy tanks which had penetrated into the forward edge of our defenses went back for their infantry, and each time the infantry was cut off from the tanks by the fire of our riflemen.

At one point several enemy tanks pierced the forward edge and came out near the observation post of the division commander. But here they were met with such a furious fire from guns and mortars that, having suffered great losses, they were compelled to withdraw. The German infantry, as elsewhere, was prevented from reaching the forward edge of our defense.

The attack of the main forces of the enemy was repelled. The enemy left on the battlefield forty-seven damaged tanks. In eleven hours the division, despite its hastily constructed defenses, managed to repel ten tank attacks. Five times enemy tanks penetrated into the depth of the defense, but, being deprived of the support of their infantry, were forced to roll back. As a result, our division saved its position, inflicted tremendous losses upon the enemy, and continued its participation in the offensive.

Thus, a successful repulse of tank counterattacks is secured, first of all, by a well functioning ground and air reconnaissance. On the basis of reconnaissance reports and of the estimate of the situation, it is very important to determine at the proper time the symptoms of impending tank counterattacks prepared by the enemy. This will enable the commander to take the necessary preventive measures.

XUM

The Royal Marines

Digested at the Command and General Staff School from an article by W. R. S. in *The Army Quarterly* (Great Britain) April 1944.

THE function of the Royal Marines in war and peace is to provide:

1. Detachments for service in H. M. ships which, while fully capable of manning their share of the gun armament, are specially trained to undertake such landing operations as the naval commander in chief may find it necessary to order.

2. Units to undertake, in cooperation with the other services, special amphibious operations.

3. Units for the rapid establishment and temporary defense of Naval and Fleet Air Arm bases.

Thus the present line of development along which the Corps is moving is to become, without prejudice to the older task of providing detachments for H. M. ships, "the nucleus of the amphibious forces of the Crown."

As the definition given above was born of operational experience, possibly an example drawn from operations will best illustrate the manner in which the role is being implemented. It is the part played by Royal Marines in the landing operations at Salerno. Here a Royal Marine commando operated ashore with other special service troops as part of the Fifth Army. Royal Marines were at the armament of various landing craft giving close support and antiaircraft protection to the landings. Farther back, the battleships of the fleet, with Royal Marines at their share of the gun armament, bombarded objectives ashore, in some cases their fire being directed by Royal Marine officers who were landed to act as forward observation officers.

This offers an outline sketch of the part the Marines may play in future amphibious operations of this nature. There are, of course, many bare patches on the canvas, but these will be filled in by future operations. It is a role which the Corps, by reason of its unique traditions and experience, is especially fitted to play. It is in the vicinity of the beach that the organizations of the Royal Navy and the Army meet, and it is here that the Royal Marines—having, so to speak, a foot in both camps—can fulfil an important office in facilitating the junction. The Army is and always must be organized on the continental model to operate from land bases. The Navy is designed primarily for the deep waters and wide horizons of the open sea. It would therefore be too much to expect that their respective systems would dovetail precisely on any given occasion. On the beaches much needs to be improvised, many concessions must be made by one great service to the other. It is therefore in the shoal waters and on the beaches and their immediate environs that the Royal Marines are likely to find the most profitable field for their endeavors.

The commando role as we know it today falls properly into three parts. These are:

1. Raids against specific objectives within the scope of a light, highly trained amphibious force.

2. Operations subsidiary to, and designed to assist, the landing of an army.

3. Operations whereby the sea is used to outflank the enemy and assist the progress of the army ashore.

Examples of all these can be found among Royal Marine operations before the adoption of the commando name and organization. Thus when the Royal Marines began to form their own commandos they were not venturing into unknown territory. They did, however, inherit the commando organization, developed by the Army, which has shown itself especially well suited to this type of operation. In addition, the Army commandos had evolved novel methods of training and tactics, from all of which experimental work the Royal Marine commandos benefit and for which they readily acknowledge a debt. What the Marines bring to the commando task is their close understanding with the Royal Navy and its methods, which is the fruit of

years of cooperation between the Royal Marine detachments afloat and their naval shipmates. It is this background of experience gained in the service of the fleet which, when added to the Corps' own traditions, fits it especially for a role in amphibious war.

In 1942 the Royal Marines undertook to provide the guns' crews for landing craft designed to give antiaircraft protection and close artillery support for landing operations. This did not include manning or command of the craft themselves, which remained the province of the Royal Navy.

During 1943 the Royal Marines began to undertake very greatly increased landing craft commitments, involving not only guns' crews for the support craft but also the provision of Marine crews to handle all types of craft. Authority was given for Royal Marine officers to command not only flotillas of minor landing craft but the major craft which rank as commissioned ships. There is no direct precedent in Corps' history for this development, but it is well in keeping with the conception of the link between Royal Navy and Army. It is a logical step from landings designed to assist the army ashore, from giving fire support to landing operations, to the actual sea-transport of the army between ship and beach.

The Royal Marines have special advantages for the task. They can talk naval language to the sailor and military language to the soldier. Kipling's well-known line, "Soldier and sailor too," is more nearly true of this role than of any other in the Corps' history. It has never been entirely true, for the Marine has always been and remains a soldier, though a soldier in the service of the fleet. In landing craft he is in closer contact with the art of seamanship, though it is seamanship within a military tactical framework, just as he has been in the past a soldier operating within the scope of a naval plan.

There remains the third arm of a combined operation, the air arm. Though Royal Marine pilots have a distinguished record in the Fleet Air Arm, there is as yet no distinctive Royal Marine role. It would appear logical that, if seaborne air support of landing operations required at any time a degree of specialization within the Fleet Air Arm, Royal Marine pilots should undertake the task.

Training as forward observation officers has been introduced into the normal program of Royal Marine officers for sea, while a number of other officers are receiving instruction as air liaison officers for duty with aircraft carriers.

This recent reorientation of policy has not affected the position of the ships' detachments, except that their military training will be conducted as far as possible on commando lines. The ship's detachment is the original Royal Marine role and still remains the basic role. It is from their close association with the Royal Navy afloat that the amphibious character of the Corps is derived.

When considering the more distant future, the form which the armed forces of the Crown as a whole will assume will naturally decide the constitution and character of the Corps. It is possible to reflect, however, that when the war broke out, amphibious operations on the scale with which we are now familiar were not foreseen. There was in existence little foundation on which the great amphibious enterprises, which we have already seen in this war, could be built up. If this situation, with the delays it imposes, is not to reoccur, there must be some permanent organization retained as a nucleus in time of peace and charged with the work of experiment and development, but capable in an emergency of great expansion. If such a nucleus be deemed necessary, what branch of the armed forces would be better suited to form it than the Royal Marines?

Nothing is so difficult, and at the same time so important, as to know when to decide.

—Napoleon

The Use of Artillery

From an article by Lieutenant General C. W. Allfrey in *Aim*, army magazine of the British Middle East Command, No. 23, July 1944.

THE following are ten points which we should all remember when considering the use of artillery:

1. Never report that you are being shelled by your own guns until you are absolutely sure beyond all doubt that it is so.

2. It has been found that when information is scanty about the enemy, the best method of getting our own infantry on to the objective is usually to fire a barrage. This has little killing effect, but enables our own infantry to get up to the objective without being heavily shot at.

3. Many people will tell you that a barrage gives away surprise. This is quite true, but even so it is better to have one rather than to launch an attack with inadequate support, as this will invariably fail. The loss of surprise can be overcome to a certain extent by guile.

For example, if the gunpower permits, barrages can be run where no attack is taking place, or smoke can be used in order to deceive the enemy as to the actual direction of attack. Or again, before an attack starts in earnest a barrage can be run on to the objective with no one following it, and then can be lifted off the objective to encourage the enemy to man his defenses.

After a short pause a crash can then be brought down on the enemy defenses to inflict casualties on him. If this is done several times the enemy will not know whether a barrage does in fact herald an attack or not.

4. In order to save ammunition, the start time for the infantry has sometimes been selected in No Man's Land. This always leads to trouble, as the forming-up of our infantry is liable to be interfered with. It is far better to select a start line well inside the country we control and ensure a tidy start.

5. The barrage should be moved forward at such a speed that the infantry can easily keep pace with it. The object is to place the infantry within assaulting distance of the objective fresh enough to cover the last hundred yards or so as fast as conditions permit. In order to do this it may be necessary to have a pause, or pauses, short of the objective to allow time for the infantry to get their breath.

6. It is essential that our infantry really do understand and believe that the safest place during an attack is as close up behind our own barrage as possible. The enemy will then have little time to man his defenses before our infantry arrive on the objective.

7. Before an attack starts, arrangements must be made for defensive fire and SOS tasks to protect our infantry when they arrive on the final objective. If this is left until the arrival on the objective it will never be done tidily, whereas a pre-arranged plan can be adjusted without much difficulty if the objective is only partially captured.

8. Directly we arrive on the objective, one of our chief dangers is the enemy mortars. By study of dispositions and air photos, every effort must therefore be made to neutralize the enemy mortars, particularly during the period immediately after the arrival on the objective.

9. You can expect your gunners to use ammunition freely when it is necessary. During slack periods, however, no more guns than are necessary should be used for a task, in order to economize ammunition which is difficult to produce and move.

10. Antiaircraft guns can often be used with great advantage to assist infantry. The 3.7-inch antiaircraft gun, for instance, is a first-class weapon to use against enemy mortars using air bursts. Or again, the Bofors gun can be a great help used on the flanks of an attack in order to assist direction-keeping or to neutralize an area on the flank of an attack if trouble is expected from this direction.